PICO830

Intel® Atom™ N2800/N2600 Processor Pico-ITX Board

User's Manual

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If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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Chapter 1
Introduction

The PICO830 is a Pico-ITX board with Intel® Atom™ N2800/N2600 and NM10 chipset that delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions.

The board has one 204-pin unbuffered SO-DIMM socket for DDR3 800/1066MHz SO-DIMM memory, maximum memory capacity up to 4GB (N2600 supports DDR3 800MHz up to 2GB only). It also features one Gigabit/Fast Ethernet, one serial ATA port with transfer rates up to 3Gb/s, four USB 2.0 high speed compliant, and built-in high definition audio codec that can achieve the best stability and reliability for industrial applications. Additionally, it provides you with unique embedded features, such as two serial ports (one RS-232/422/485 and one RS-232) and Pico-ITX form factor that applies an extensive array of PC peripherals. The board can be enhanced by its built-in watchdog timer function, a special industrial feature not commonly seen on other motherboards.

1.1 Features

- Intel® Atom™ dual core N2800 (1.86GHz) and N2600 (1.6GHz)
- Intel® NM10 chipset
- 1 DDR3 SO-DIMM supports up to 4GB memory capacity
- 4 USB 2.0 ports
- 2 COM ports
- +5V only DC-in supported

1.2 Specifications

- **CPU**
  - Intel® Atom™ dual core N2800 1.86 GHz.
  - Intel® Atom™ dual core N2600 1.6 GHz

- **Thermal Solution**
  - Fanless but with reserved fan connector.

- **System Chipset**
  - Intel® NM10 chipset.

- **BIOS**
  - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
  - 16Mbit SPI Flash, DMI, Plug and Play.
  - RPL/PXE Ethernet Boot ROM.

- **System Memory**
  - One 204-pin unbuffered DDR3 SO-DIMM socket.
  - Maximum up to 4GB DDR3 1066MHz memory for N2800.
  - Maximum up to 2GB DDR3 800MHz memory for N2600.

- **Onboard Multi I/O**
  - Controller: Fintek F81801U.
  - Serial Ports: One port for RS-232/422/485 and one port for RS-232.

- **Serial ATA**
  - One SATA-300 connector.

- **CFast™ Socket**
  - One CFast™ socket.

- **USB Interface**
  - Four USB ports with fuse protection and complies with USB Spec. Rev. 2.0.

- **Display**
  - A standard 15-pin D-Sub VGA connector which co-layout with a DisplayPort connector.
  - One 40-pin connector for 18/24-bit single/dual channel LVDS and one 8-pin inverter connector. LVDS resolution is up to 1600x1200 in 24-bit dual channel.

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.

- **Ethernet**
  - One port with Intel® 82583V for Gigabit/Fast Ethernet.
  - One RJ-45 connector.

- **Audio**
  - HD audio compliant with Realtek ALC662.
  - MIC-in and line-out in pin header.

- **Power Input**
  - DC power jack connector, co-layout with 1x2-pin right angle connector.
  - +5V DC-in only.
  - AT auto power on function supported.

- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).

- **Form Factor**
  - Pico-ITX form factor.

Note: ***All specifications and images are subject to change without notice.***

1.3 Utilities Supported

- Chipset and graphics driver
- Ethernet driver (82583V)
- Audio driver
- Unify API for hardware monitor and watchdog timer

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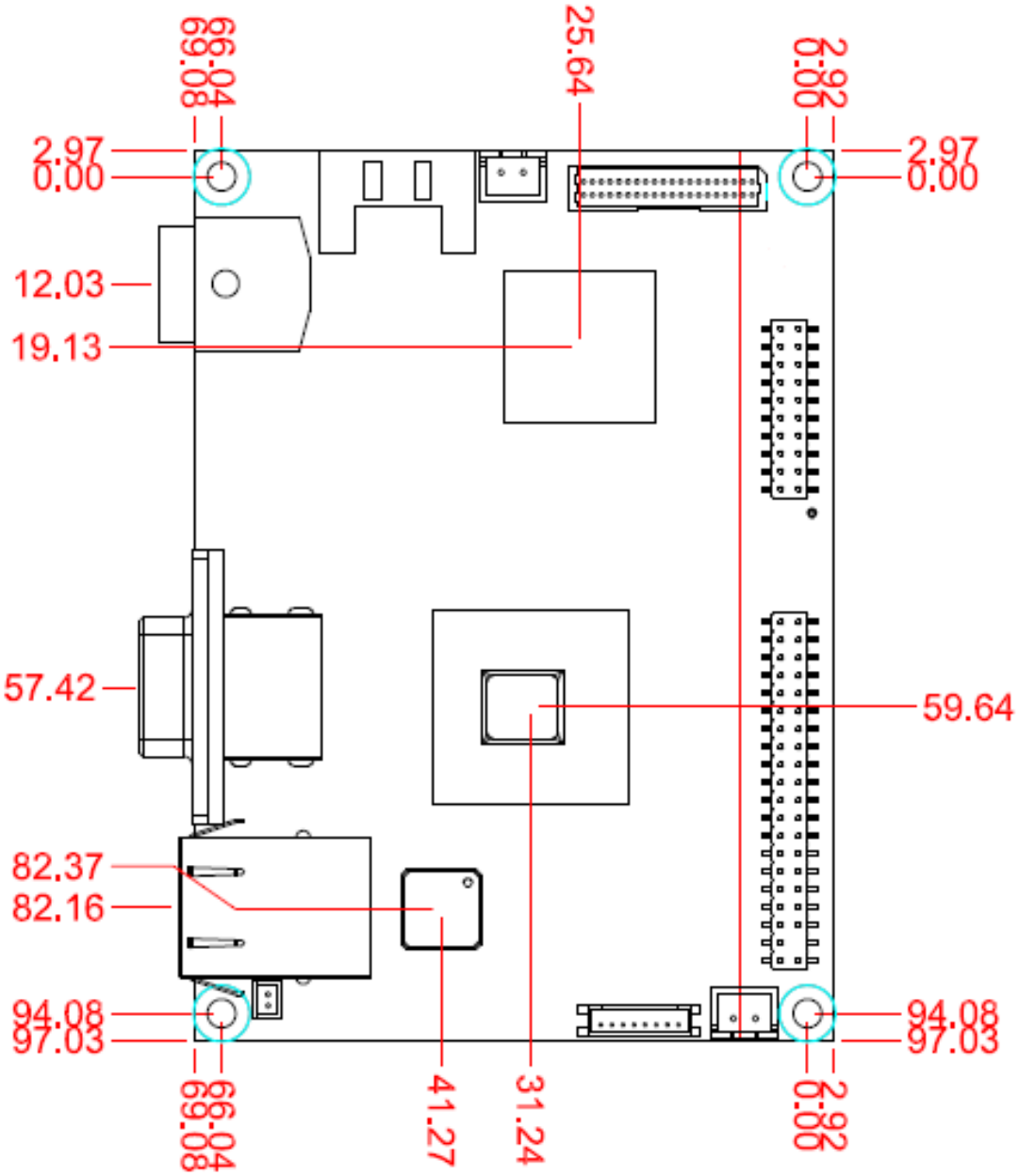
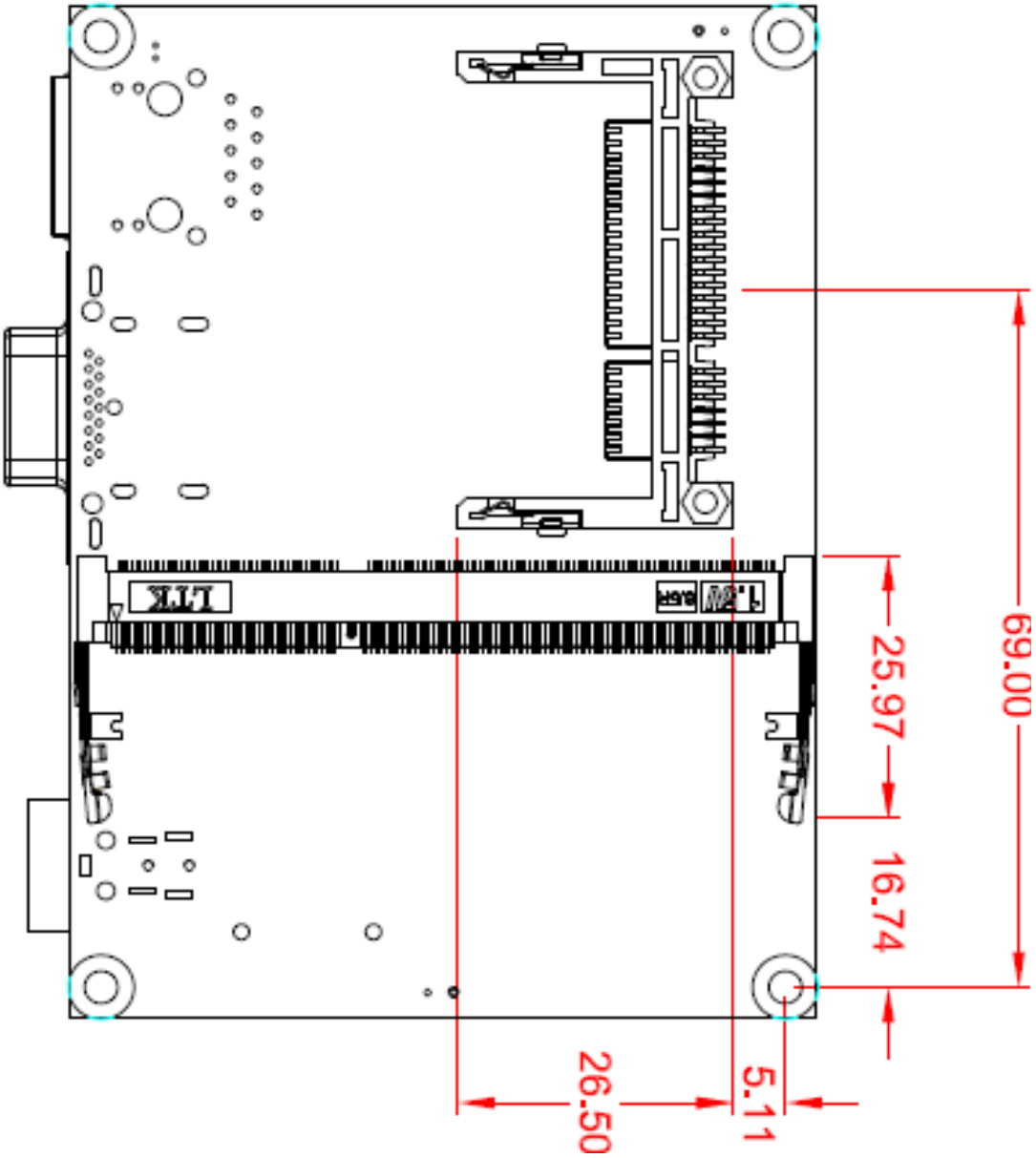
Chapter 2
Board and Pin Assignments

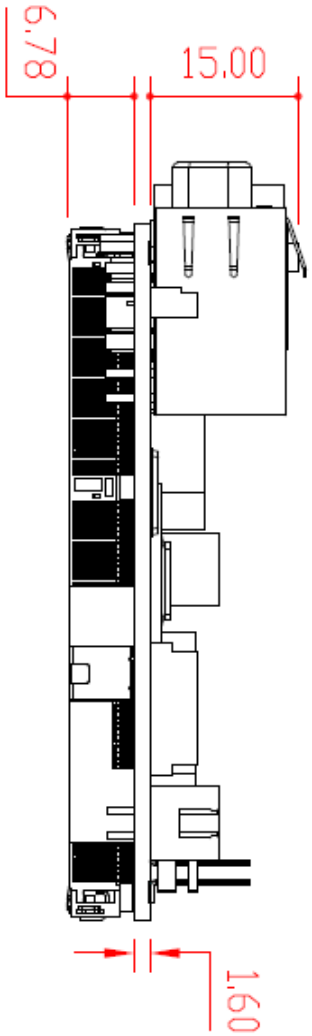
2.1 Board Dimensions and Fixing Holes



Top View

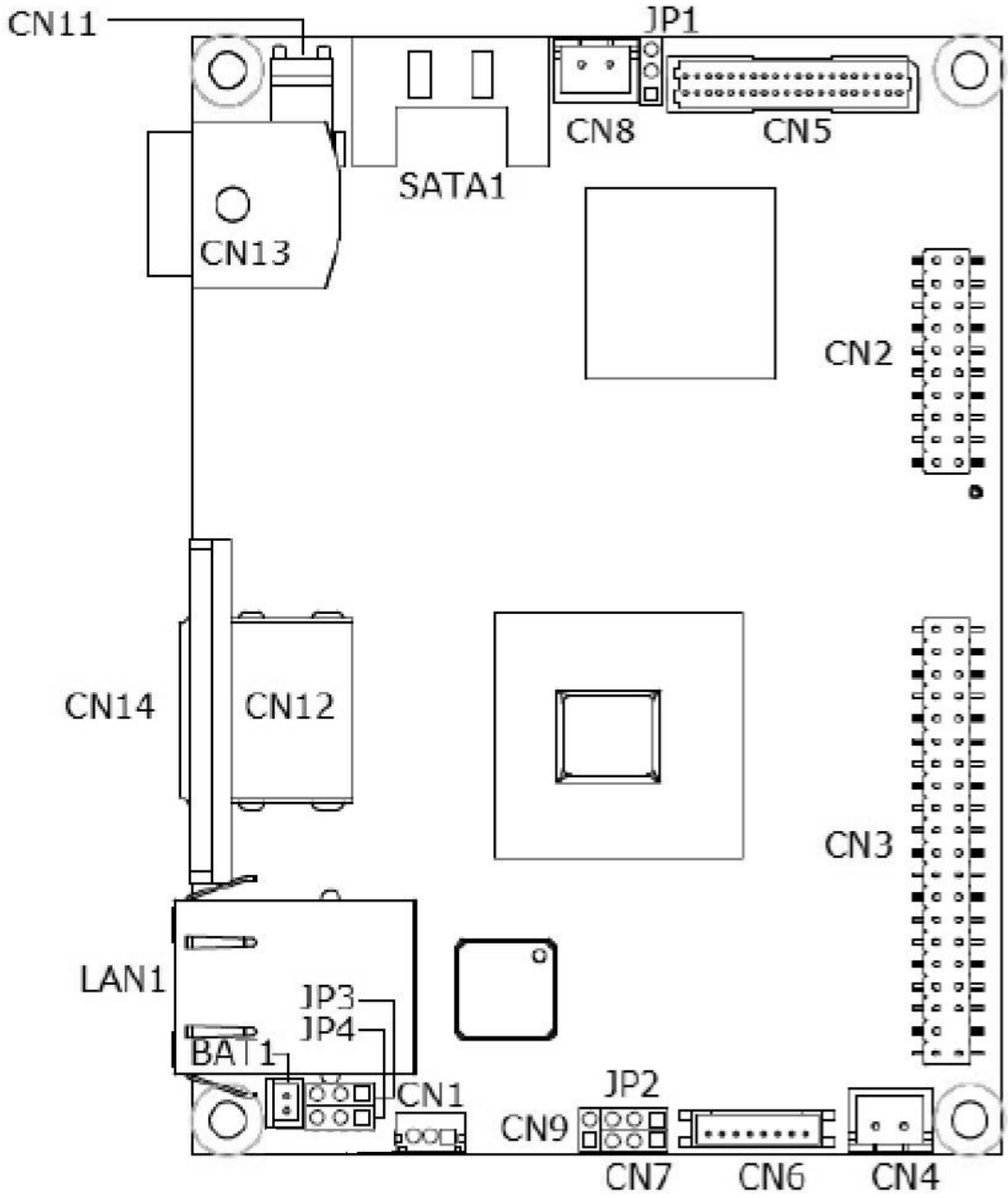


Bottom View

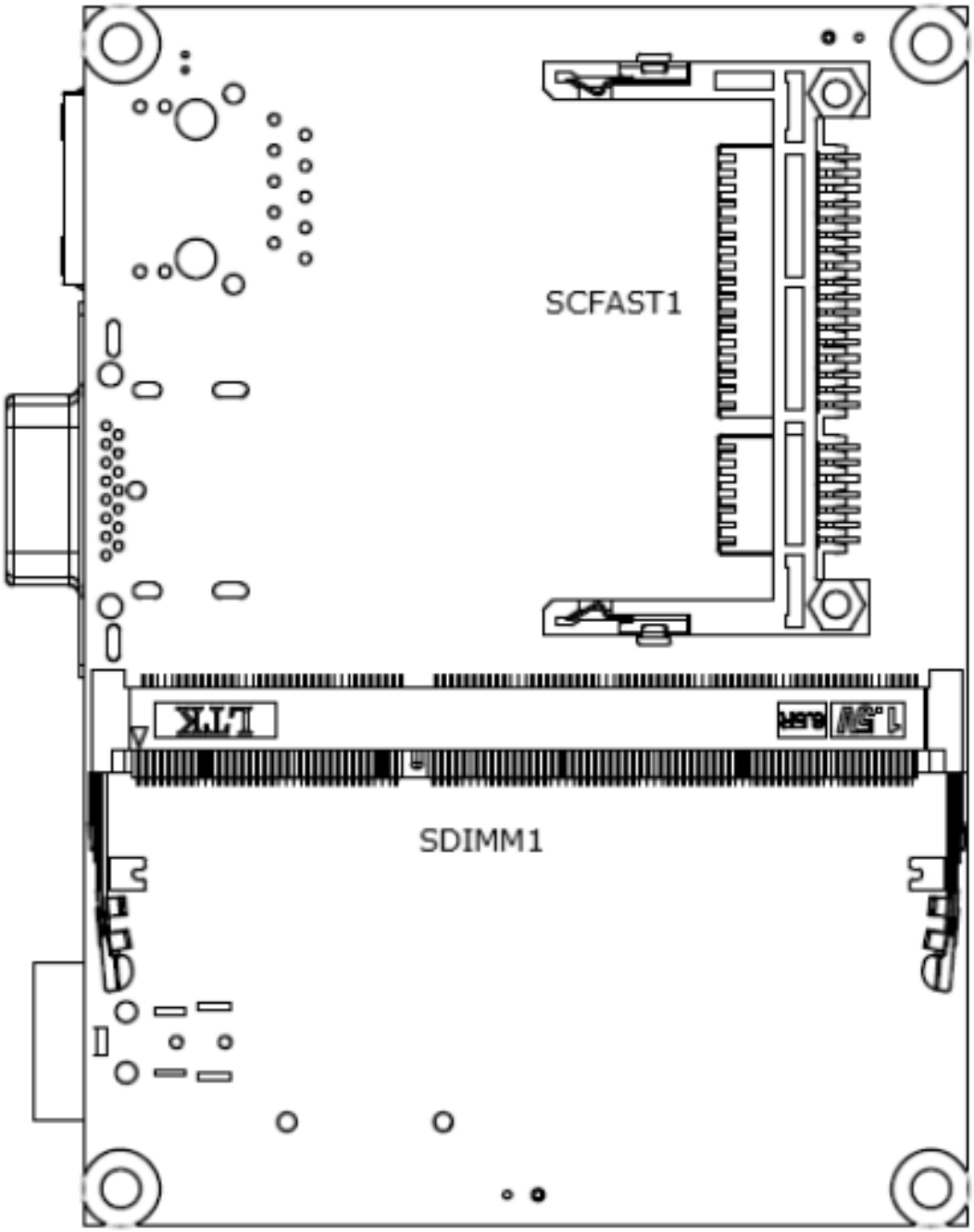


Side View

2.2 Board Layout



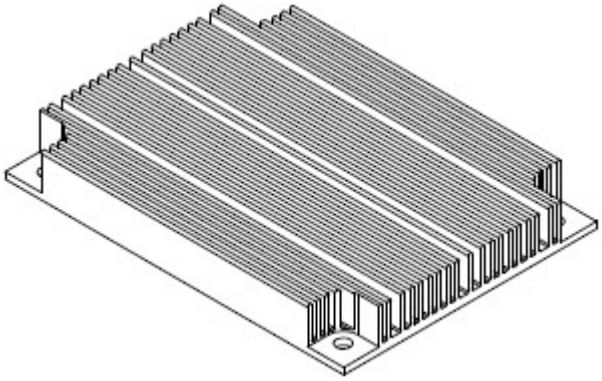
Top View



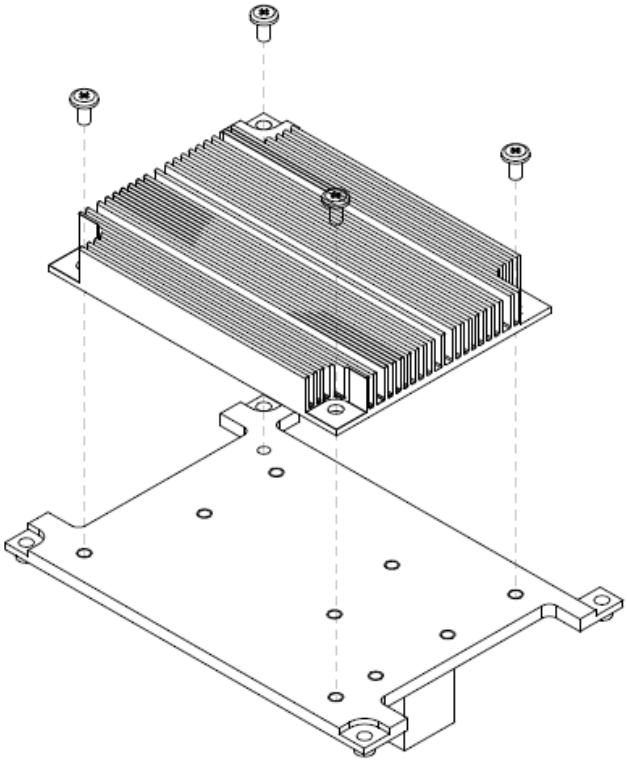
Bottom View

2.3 Assembly Drawing

Heatsink for PICO830 (see image below):



First of all, screw heatsink into heatspreader.



x4

For thermal dissipation, a heatspreader enables the PICO830's components to dissipate heat efficiently. Images below illustrate how to install the heat spreader.

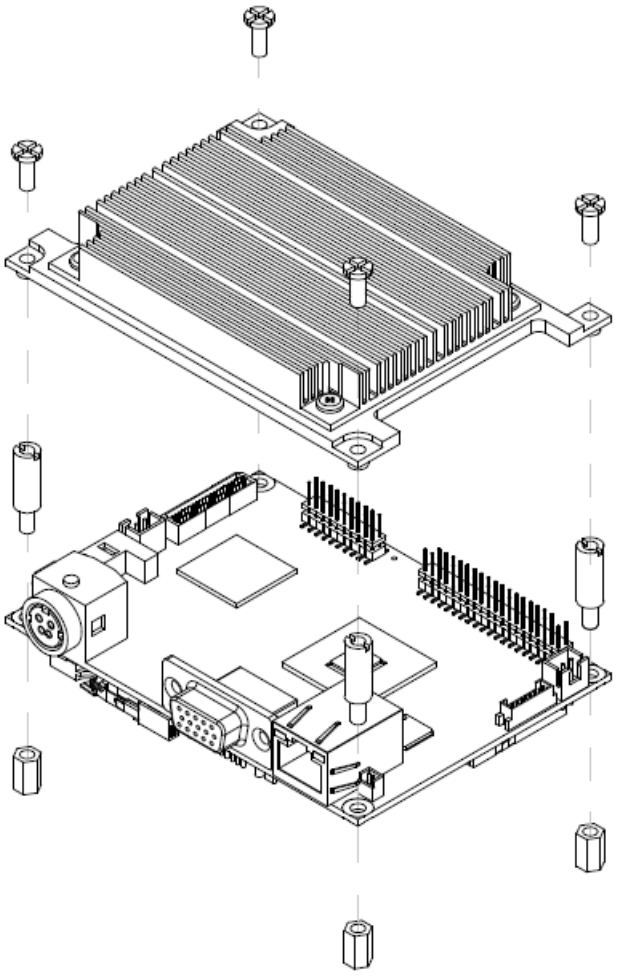
Installing Heatspreader

The PICO830 has four assembly holes for installing heatspreader plate. Align both of them and use the four screws to firmly secure the heatspreader plate to the PICO830. Be careful not to over-tighten the screws.

x4

x4

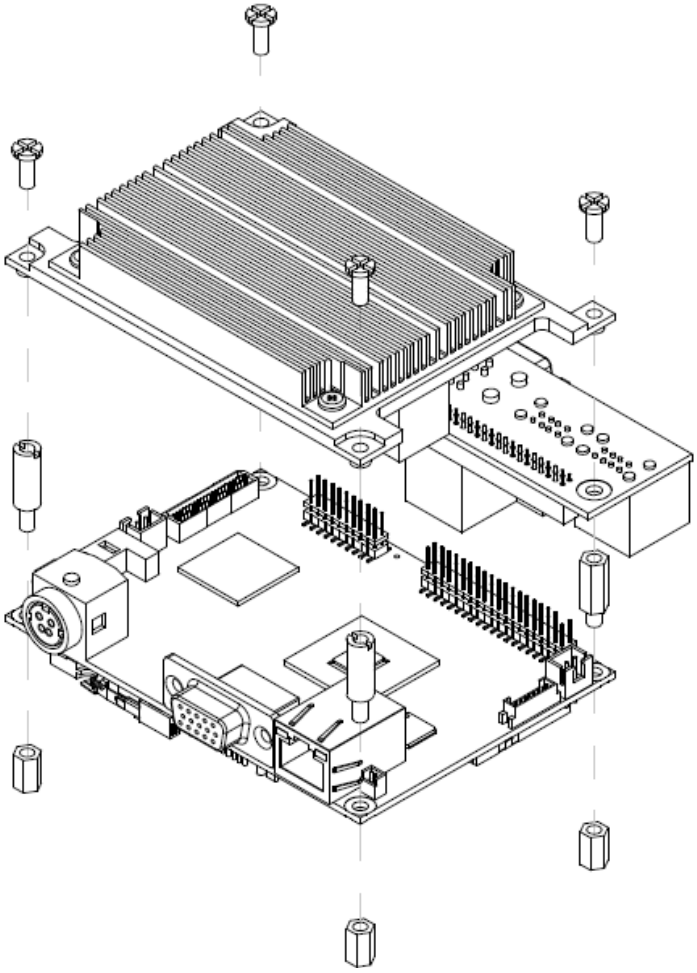
x4



Installing Heatspreader and AX93265 I/O Board

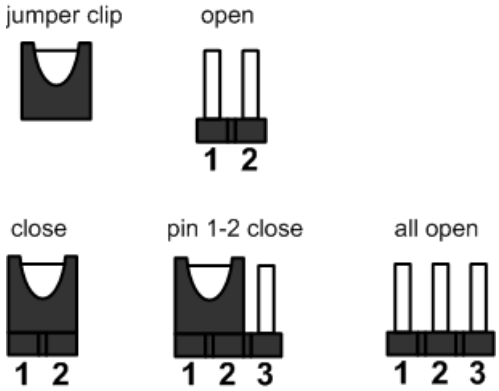
Gently insert I/O Board into CN2 and CN3. Align four assembly holes and use the four screws to firmly secure the heatspreader plate and I/O board to the PICO830. Be careful not to over-tighten the screws. See chapter 3 for details of AX93265 I/O board.

x4 x2 x2 x4



2.4 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. Below illustration shows how to set up jumper.



Properly configure jumper settings on the PICO830 to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

Note: Once the default jumper setting needs to be changed, please do it under power-off condition.

Jumper	Description	Setting
JP1	LVDS Voltage Selection Default: +3.3V	1-2 Close
JP2	LVDS Brightness Control Mode Setting Default: PWM Mode	1-2 Close
JP3	Auto Power On Default: Disable	2-3 Close
JP4	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Close

2.4.1 LVDS Voltage Selection (JP1)

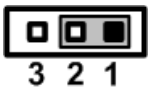
The board supports voltage selection for flat panel displays. Use JP1 to set LVDS connector (CN5) pin 1~6 VCCM to +3.3V or +5V.

Function	Setting
+3.3V (Default)	1-2 close
+5V	2-3 close

2.4.2 LVDS Brightness Control Mode Setting (JP2)

The JP2 enables you to select PWM or voltage control mode for inverter connector (CN6). These two control modes are for adjusting the brightness of LVDS panel.

Function	Setting
PWM mode (Default)	1-2 close
Voltage mode	2-3 close



2.4.3 Auto Power On (JP3)

If JP3 is enabled for AC power input, the system will be automatically power on without pressing soft power button. If JP3 is disabled for AC power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Disable auto power on (Default)	2-3 close
Enable auto power on	1-2 close

Note: ***This function is similar to the feature of power on after power failure, which is controlled by hardware circuitry instead of BIOS.***

2.4.4 Restore BIOS Optimal Defaults (JP4)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close

2.5 Connectors

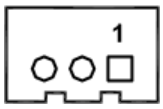
Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

Connector	Description
CN1	SMBus Connector
CN2	Thru Front I/O Connector 1
CN3	Thru Front I/O Connector 2
CN4	Serial ATA Power Connector
CN5	LVDS Connector
CN6	Inverter Connector
CN7	External Speaker and Internal Buzzer Header
CN8	Fan Power Connector
CN9	Power LED Header
CN11	DC Power Connector (Optional)
CN12	DisplayPort Connector
CN13	DC Power Jack
CN14	VGA Connector
LAN1	Ethernet Port
SATA1	Serial ATA Connector
BAT1	CMOS Battery Connector
SCFAST1	CFast™ Socket
SDIMM1	DDR3 SO-DIMM Connector

2.5.1 SMBus Connector (CN1)

This connector is for SMBus interface. The SMBus (System Management Bus) is a simple 2-wire bus for the purpose of lightweight communication.

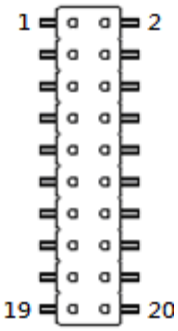
Pin	Signal
1	SMBus clock
2	SMBus data
3	GND



2.5.2 Thru Front I/O Connectors (CN2 and CN3)

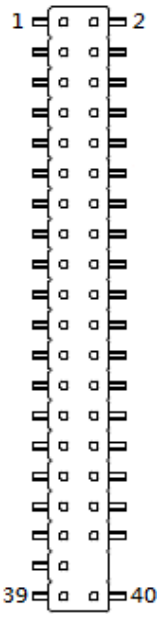
The pin assignments of CN2 are given as follows.

Pin	Signal	Pin	Signal
1	DCD2	2	DSR2
3	RXD2	4	RTS2
5	TXD2	6	CTS2
7	DTR2	8	RI2
9	GND	10	+5V
11	DCD1	12	DSR1
13	RXD1	14	RTS1
15	TXD1	16	CTS1
17	DTR1	18	RI1
19	GND	20	+5V



The pin assignments of CN3 are given as follows.

Pin	Signal	Pin	Signal
1	MIC	2	LINE_OUT_L
3	LINE_IN_L	4	LINE_OUT_R
5	LINE_IN_R	6	GND
7	GND	8	GND
9	GND	10	GND
11	USB1_PWR	12	USB1_PWR
13	USB0_DATA-	14	USB1_DATA-
15	USB0_DATA+	16	USB1_DATA+
17	GND	18	GND
19	GND	20	GND
21	USB2_PWR	22	USB2_PWR
23	USB2_DATA-	24	USB3_DATA-
25	USB2_DATA+	26	USB3_DATA+
27	GND	28	GND
29	GND	30	GND
31	+5V	32	PS_ON
33	RESET	34	GND
35	+5V	36	+5V
37	HDD_LED	38	N.C
39	GND	40	+5V

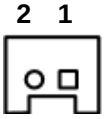


Note: ***It is suggested to insert AX93265 I/O board into CN2 and CN3 (see chapter 3 for details of AX93265).***

2.5.3 Serial ATA Power Connector (CN4)

The CN4 is a 2.5mm pitch wafer connector for serial ATA (SATA) power interface.

Pin	Signal
1	+5V
2	GND



2.5.4 LVDS Connector (CN5)

This board has a 40-pin connector for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B 40-pin connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V or +5V by setting JP1 (see section 2.4.1).

18-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	N.C
13	N.C	14	N.C
15	GND	16	GND
17	N.C	18	N.C
19	N.C	20	N.C
21	GND	22	GND
23	Channel A D0-	24	N.C
25	Channel A D0+	26	N.C
27	GND	28	GND
29	Channel A D1-	30	N.C
31	Channel A D1+	32	N.C
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

24-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	N.C
13	N.C	14	N.C
15	GND	16	GND
17	N.C	18	N.C
19	N.C	20	N.C
21	GND	22	GND
23	Channel A D0-	24	N.C
25	Channel A D0+	26	N.C
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

18-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	N.C	12	Channel B D0-
13	N.C	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	N.C
31	Channel A D1+	32	N.C
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

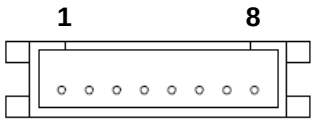
24-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C	8	N.C
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

2.5.5 Inverter Connector (CN6)

This is a DF13-8S-1.25C 8-pin connector for inverter. We strongly recommend you to use the matching DF13-8S-1.25C connector to avoid malfunction.

Pin	Signal
1	+5V
2	+5V
3	+5V
4	BL_ENABLE
5	GND
6	GND
7	GND
8	BR_CTRL



2.5.6 External Speaker and Internal Buzzer Header (CN7)

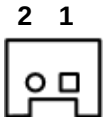
Pin 1, 2 and 3 connect the case-mounted speaker unit or internal buzzer. While connecting the CPU board to an internal buzzer, please set pin 2 and 3 closed (default); while connecting to an external speaker, you need to set pins 2 and 3 opened and connect the speaker cable to pin 1(+) and pin 2(-).

Pin	Signal
1	EXT SPK+
2	EXT SPK-
3	Buzzer

2.5.7 Fan Power Connector (CN8)

The CN8 is a 2.5mm pitch wafer connector for fan power interface.

Pin	Signal
1	+5V
2	GND



2.5.8 Power LED Header (CN9)

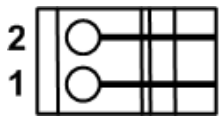
The CN9 is for power LED interface.

Pin	Signal
1	+5V
2	GND

2.5.9 DC Power Connector (CN11) (Optional)

The CN11 (co-layout with CN13) is a 1x2-pin wafer connector in right angle (pitch=3.96mm) for DC +5V input.

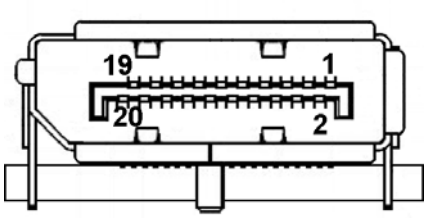
Pin	Signal
1	+5V
2	GND



2.5.10 DisplayPort Connector (CN12)

The DisplayPort interface is available through connector CN12 which is also co-layout with VGA connector (CN14).

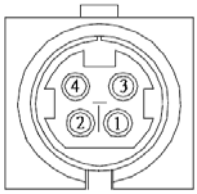
Pin	Signal
1	DDPC_0P
2	GND
3	DDCP_0N
4	DDPC_1P
5	GND
6	DDCP_1N
7	DDPC_2P
8	GND
9	DDCP_2N
10	DDPC_3P
11	GND
12	DDCP_3N
13	HDMI_DETE
14	GND
15	DCP_AUX_DP
16	GND
17	DCP_AUX_DN
18	DDC_HDP
19	GND
20	DP_PWR



2.5.11 DC Power Jack (CN13)

The CN13 is a DC power jack for DC +5V input.

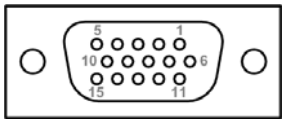
Pin	Signal
1	GND
2	GND
3	+5V
4	+5V



2.5.12 VGA Connector (CN14)

The CN14 is a standard 15-pin D-Sub connector which is co-layout with DisplayPort connector (CN12). It is commonly used for CRT VGA display. This VGA interface configuration can be configured via software utility.

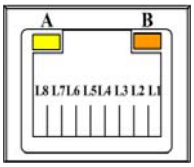
Pin	Signal	Pin	Signal
1	RED	2	GREEN
3	BLUE	4	N.C
5	GND	6	CRT_DETE
7	GND	8	GND
9	CRT_VCC	10	GND
11	N.C	12	DDC_DATA
13	Hsync	14	Vsync
15	DDC_CLK		



2.5.13 Ethernet Port (LAN1)

The board has one RJ-45 ethernet connector. Connection can be established by plugging one end of the ethernet cable into this RJ-45 connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

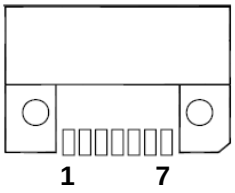
Pin	Signal	Pin	Signal
L1	MDI0P	L5	MDI2P
L2	MDI0N	L6	MDI2N
L3	MDI1P	L7	MDI3P
L4	MDI1N	L8	MDI3N
A	Active LED (Yellow)		
B	100 LAN LED (Green) / 1000 LAN LED (Orange)		



2.5.14 Serial ATA Connector (SATA1)

This Serial Advanced Technology Attachment (Serial ATA or SATA) connector is for high-speed SATA interface port. It is a computer bus interface for connecting to devices such as hard disk drives.

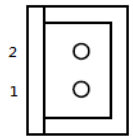
Pin	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



2.5.15 CMOS Battery Connector (BAT1)

This connector is for CMOS battery interface.

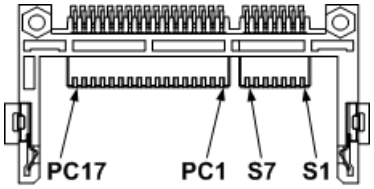
Pin	Signal
1	+3.3V
2	GND



2.5.16 CFast™ Socket (SCFAST1)

The board is equipped with a CFast™ socket on the bottom side to support a CFast™ card which is based on the Serial ATA bus. The socket is specially designed to avoid incorrect installation of the CFast™ card. When installing or removing the CFast™ card, please make sure the system power is off. The CFast™ card by default identifies itself as C: or D: drive in your PC system.

Pin	Signal	Pin	Signal
S1	GND	P1	N.C
S2	TXP	P2	GND
S3	TXN	P3	N.C
S4	GND	P4	N.C
S5	RXN	P5	N.C
S6	RXP	P6	N.C
S7	GND	P7	GND
		P8	N.C
		P9	N.C
		P10	N.C
		P11	N.C
		P12	N.C
		P13	+3.3V
		P14	+3.3V
		P15	GND
		P16	GND
		P17	N.C



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Chapter 3
I/O Board

The AX93265 is an I/O expansion board which is suggested to insert carefully into CN2 and CN3 of PICO830. Its specifications and detailed information are given in this chapter.

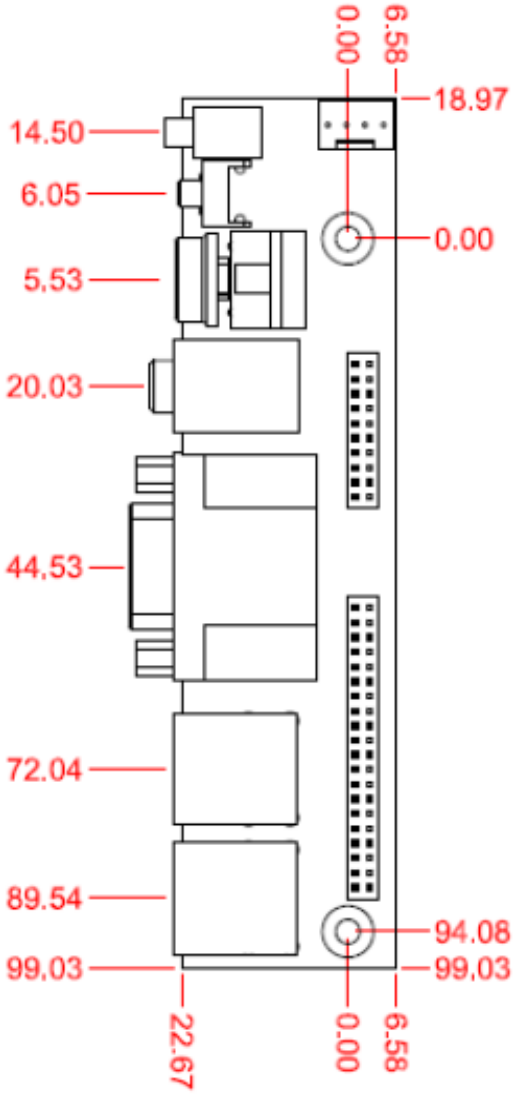
3.1 AX93265 Specifications

- **Size**
  - 29.25mm x 118mm

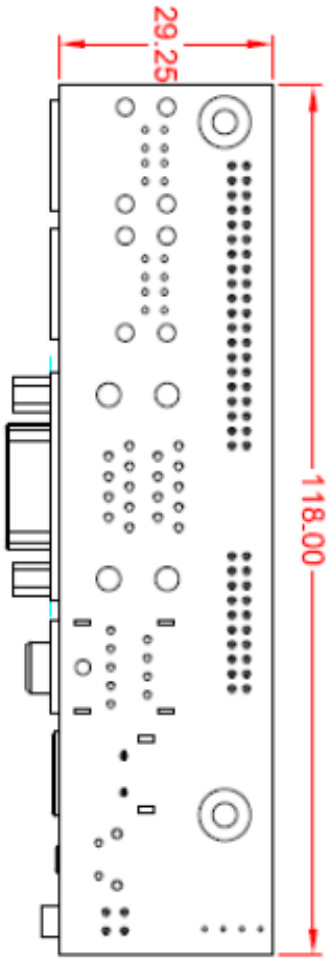
- **Features**
  - Supports audio jack (MIC-in/line-out).
  - Four USB 2.0.
  - Serial Ports: One port for RS-232/422/485 and one port for RS-232.
  - Power-on, reset and red/green LED.

Note: ***All specifications and images are subject to change without notice.***

3.2 AX93265 Dimensions and Fixing Holes

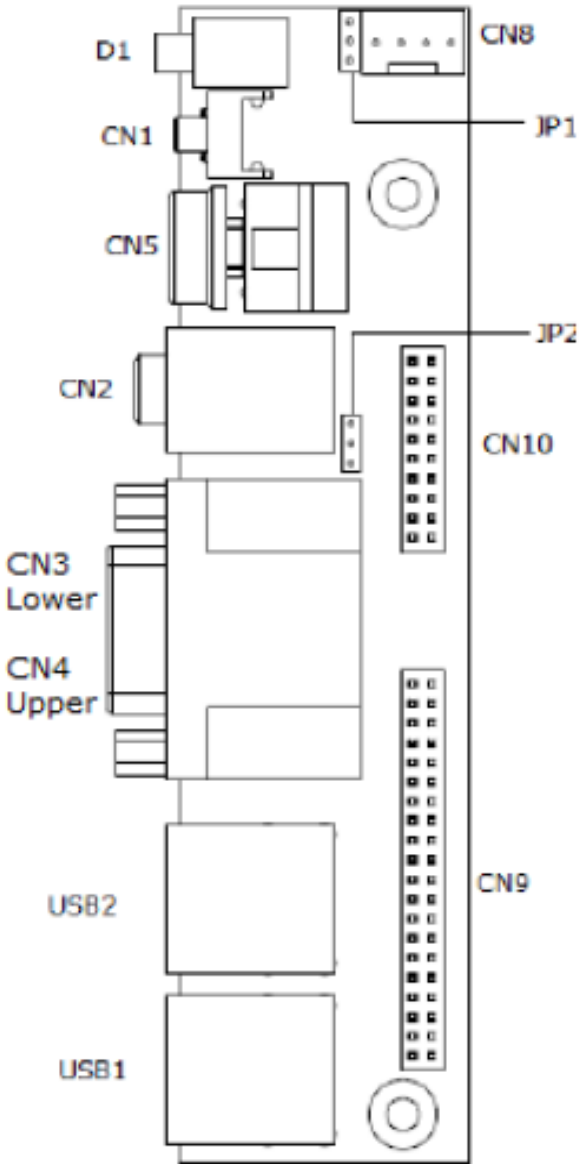


Top View



Bottom View

3.3 AX93265 Board Layout



Top View

3.4 AX93265 Jumper Settings

Properly configure jumper settings on the AX93265 I/O board to meet your application purpose. Below you can find a summary table of all jumpers and onboard default settings.

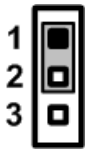
Note: Once the default jumper setting needs to be changed, please do it under power-off condition.

Jumper	Description		Setting
JP1	COM1 Data/+12V Power Selection Default: RS-232 Data	CN3 Pin 18: RI	1-2 Close
JP2	COM1 Data/+5V Power Selection Default: RS-232 Data	CN3 Pin 10: DCD	1-2 Close

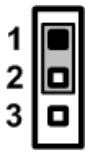
3.4.1 COM1 Data/Power Selection (JP1 and JP2)

The COM1 port has +12V level power capability on RI and +5V level on DCD by setting JP1 and JP2, respectively. When this port is set to +12V or +5V level, please make sure its communication mode is RS-232 (see section 5.4).

Function	JP1 Setting
Data: Set CN3 pin 18 to RI (Default)	1-2 close
Power: Set CN3 pin 18 to +12V level	2-3 close



Function	JP2 Setting
Data: Set CN3 pin 10 to DCD (Default)	1-2 close
Power: Set CN3 pin 10 to +5V level	2-3 close



3.5 AX93265 Connectors, Switches and LED

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors, switches and LED on the hardware.

Connector	Description
CN1	System Reset Switch
CN2	Audio Jack
CN3	COM1 Connector
CN4	COM2 Connector
CN5	System Power Switch
CN8	HDD Power Connector
CN9	Thru Front I/O Connector 2
CN10	Thru Front I/O Connector 1
D1	Power and HDD LED indicator
USB1~USB2	USB 2.0 Connectors

3.5.1 System Reset Switch (CN1)

This switch reboots your computer without turning off the power supply. It is a better way to reboot your system for a longer life of the system power supply.

Function	Description
On	Reset system
Off	Keep system status

3.5.2 Audio Jack (CN2)

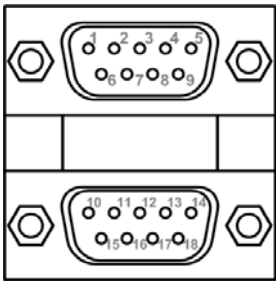
This is audio jack with HD audio support. Install audio driver, and then attach audio devices to CN2.

Pin Color	Signal
Green	Line-out
Pink	MIC-in

3.5.3 COM1 Connector (CN3)

CN3 is the lower connector of the double-deck DB-9 connector. COM1 comes with power capability on DCD and RI pins by setting jumpers (see section 3.4.1). The pin assignments of RS-232/RS-422/RS-485 are listed in table below. If you need COM1 port to support RS-422 or RS-485, please refer to section 5.4.

Pin	RS-232	RS-422	RS-485
10	DCD	TX-	Data-
11	RXD	TX+	Data+
12	TXD	RX+	N.C
13	DTR	RX-	N.C.
14	GND	No use	No use
15	DSR	No use	No use
16	RTS	No use	No use
17	CTS	No use	No use
18	RI	No use	No use

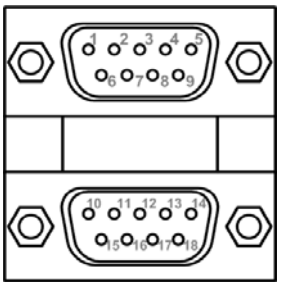


CN3

3.5.4 COM2 Connector (CN4)

CN4 is the upper connector of the double-deck DB-9 connector. The pin assignments of RS-232 are listed as below.

Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

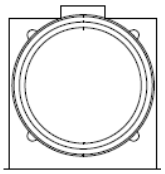


CN4

3.5.5 System Power Switch (CN5)

This switch is for turning on/off the system power.

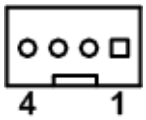
Function	Description
On	Turn on/off system
Off	Keep system status



3.5.6 HDD Power Connector (CN8)

This connector is for Hard Disk Drive (HDD) power interface.

Pin	Signal
1	+5V
2	GND
3	GND
4	+12V

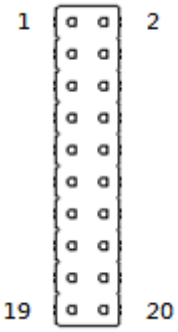


Note: ***The maximum current for pin 4 is 0.4A.***

3.5.7 Thru Front I/O Connectors (CN9 and CN10)

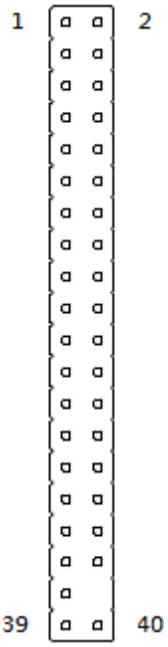
The pin assignments of CN10 are given as follows.

Pin	Signal	Pin	Signal
1	DCD2	2	DSR2
3	RXD2	4	RTS2
5	TXD2	6	CTS2
7	DTR2	8	RI2
9	GND	10	+5V
11	DCD1	12	DSR1
13	RXD1	14	RTS1
15	TXD1	16	CTS1
17	DTR1	18	RI1
19	GND	20	+5V



The pin assignments of CN9 are given as follows.

Pin	Signal	Pin	Signal
1	MIC	2	LINE_OUT_L
3	LINE_IN_L	4	LINE_OUT_R
5	LINE_IN_R	6	GND
7	GND	8	GND
9	GND	10	GND
11	USB1_PWR	12	USB1_PWR
13	USB0_DATA-	14	USB1_DATA-
15	USB0_DATA+	16	USB1_DATA+
17	GND	18	GND
19	GND	20	GND
21	USB2_PWR	22	USB2_PWR
23	USB2_DATA-	24	USB3_DATA-
25	USB2_DATA+	26	USB3_DATA+
27	GND	28	GND
29	GND	30	GND
31	+5V	32	PS_ON
33	RESET	34	GND
35	+5V	36	+5V
37	HDD_LED	38	N.C
39	GND	40	+5V



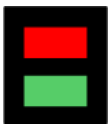
Note: ***Please gently insert CN9 and CN10 into CN2 and CN3 of PICO830.***

3.5.8 Power and HDD LED Indicator (D1)

The red LED is linked to Hard Disk Drive (HDD) activity signal. LED flashes every time HDD is accessed.

The power LED (green) lights up and will remain steady while the system is powered on.

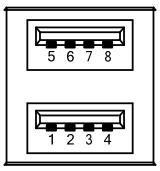
LED Color	Description
Red	Hard disk drive activity
Green	Power on/off



3.5.9 USB Connectors (USB1 and USB2)

The board comes with two double-deck Universal Serial Bus (compliant with USB 2.0 (480Mbps)) connectors on the rear I/O which are for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pin	Signal	Pin	Signal
1	+5V	5	+5V
2	USB1/3_DATA-	6	USB2/4_DATA-
3	USB1/3_DATA+	7	USB2/4_DATA+
4	GND	8	GND



Chapter 4
Hardware Description

4.1 Microprocessors

The PICO830 supports Intel® Atom™ N2800/N2600 processors, which enable your system to operate under Windows® 7 environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

4.2 BIOS

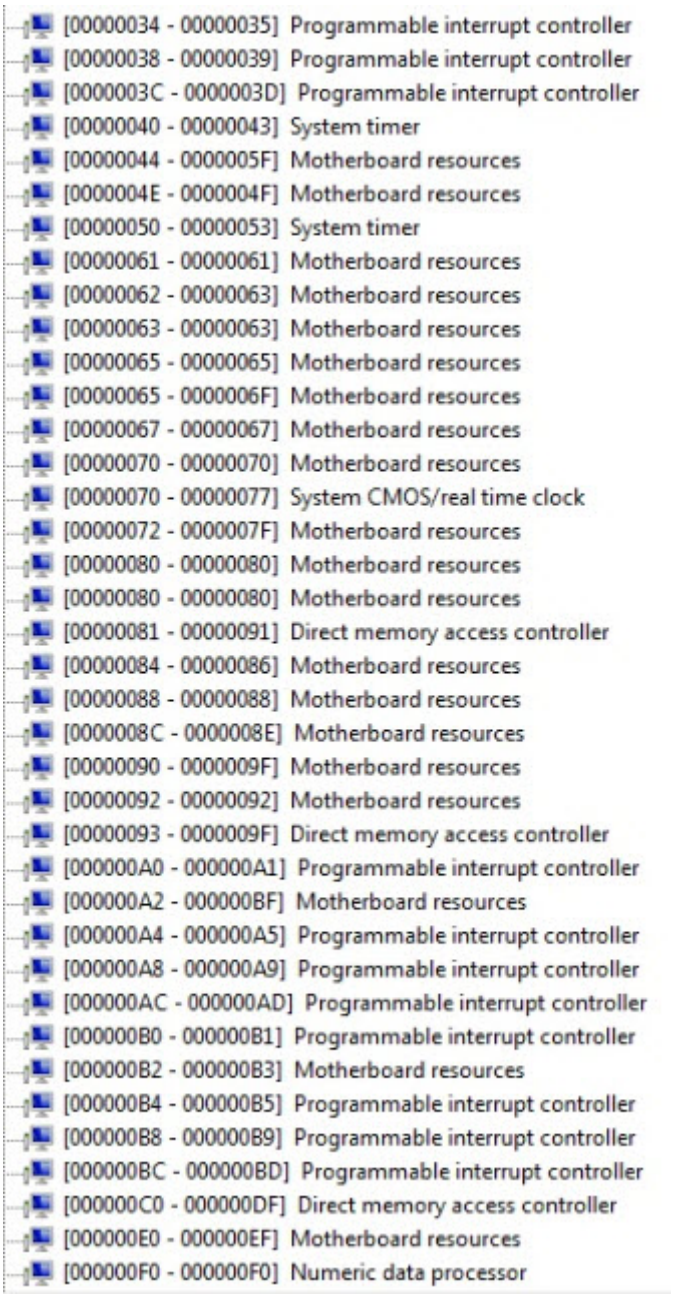
The PICO830 uses AMI Plug and Play BIOS with a single 16Mbit SPI Flash.

4.3 System Memory

The PICO830 supports one 204-pin DDR3 SO-DIMM socket for a maximum memory of 4GB DDR3 SDRAMs. The memory module comes in sizes of 1GB, 2GB and 4GB.

4.4 I/O Port Address Map

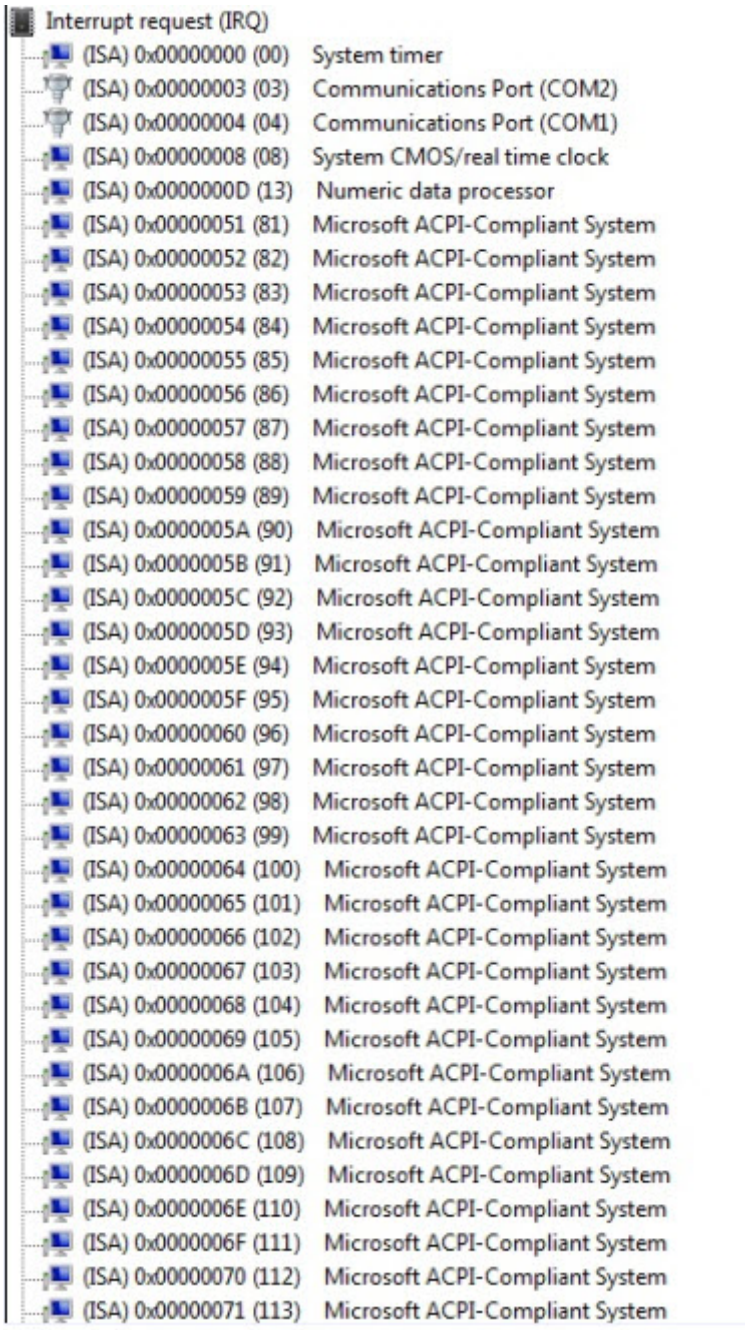
The Intel® Atom™ N2800/N2600 processors communicate via I/O ports. Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.

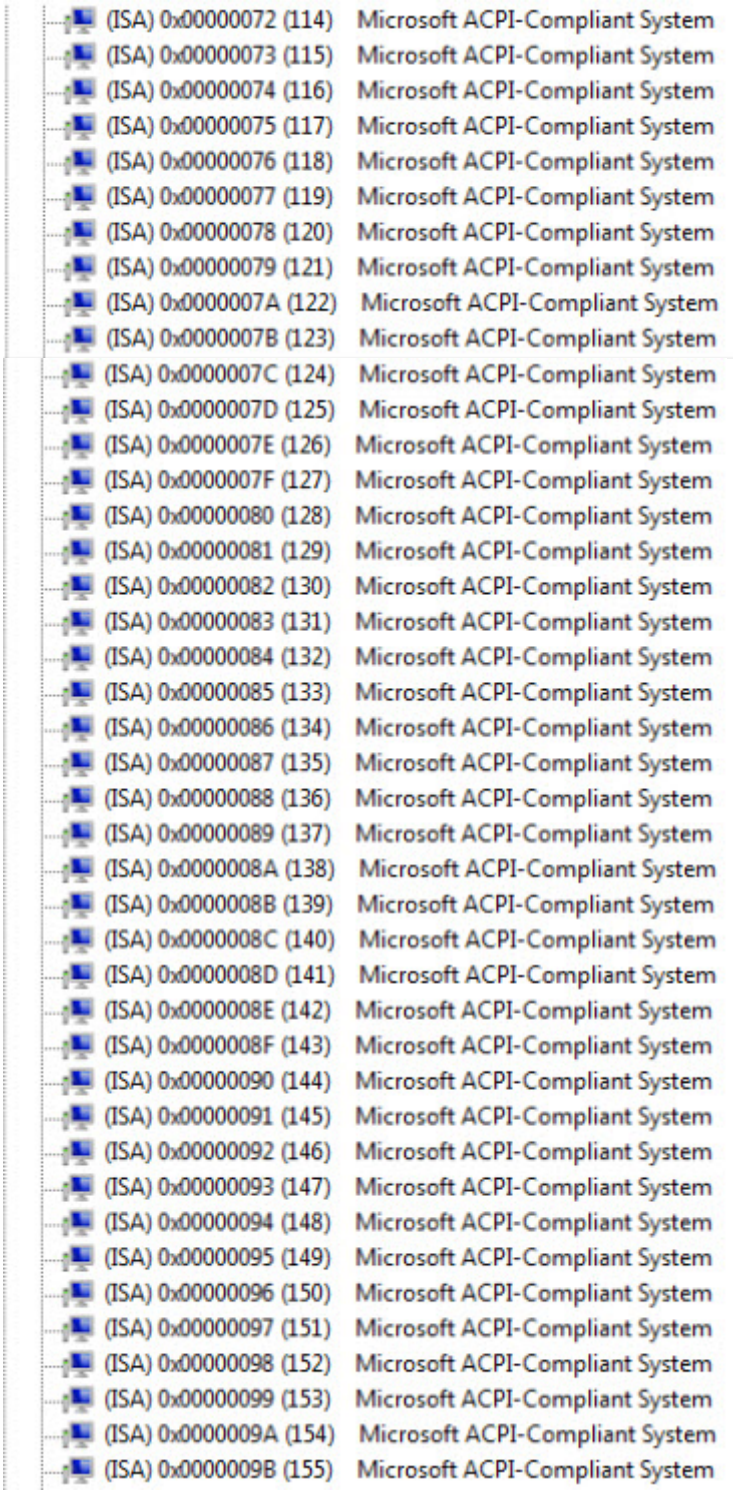

[00000034 - 00000035] Programmable interrupt controller
[00000038 - 00000039] Programmable interrupt controller
[0000003C - 0000003D] Programmable interrupt controller
[00000040 - 00000043] System timer
[00000044 - 0000005F] Motherboard resources
[0000004E - 0000004F] Motherboard resources
[00000050 - 00000053] System timer
[00000061 - 00000061] Motherboard resources
[00000062 - 00000063] Motherboard resources
[00000063 - 00000063] Motherboard resources
[00000065 - 00000065] Motherboard resources
[00000065 - 0000006F] Motherboard resources
[00000067 - 00000067] Motherboard resources
[00000070 - 00000070] Motherboard resources
[00000070 - 00000077] System CMOS/real time clock
[00000072 - 0000007F] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000081 - 00000091] Direct memory access controller
[00000084 - 00000086] Motherboard resources
[00000088 - 00000088] Motherboard resources
[0000008C - 0000008E] Motherboard resources
[00000090 - 0000009F] Motherboard resources
[00000092 - 00000092] Motherboard resources
[00000093 - 0000009F] Direct memory access controller
[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000A4 - 000000A5] Programmable interrupt controller
[000000A8 - 000000A9] Programmable interrupt controller
[000000AC - 000000AD] Programmable interrupt controller
[000000B0 - 000000B1] Programmable interrupt controller
[000000B2 - 000000B3] Motherboard resources
[000000B4 - 000000B5] Programmable interrupt controller
[000000B8 - 000000B9] Programmable interrupt controller
[000000BC - 000000BD] Programmable interrupt controller
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[000000F0 - 000000F0] Numeric data processor

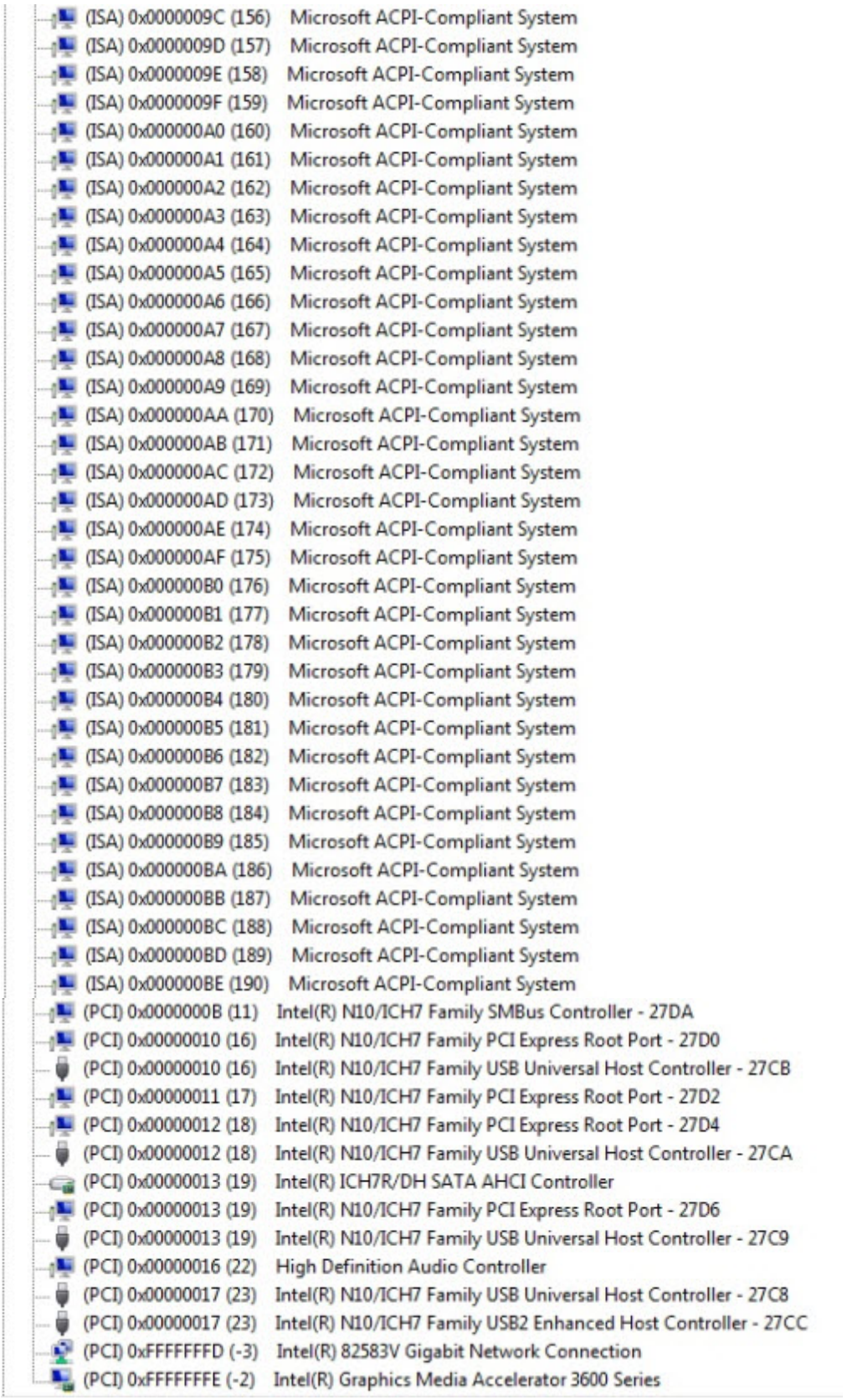
[00000088 - 00000088] Motherboard resources
[0000008C - 0000008E] Motherboard resources
[00000090 - 0000009F] Motherboard resources
[00000092 - 00000092] Motherboard resources
[00000093 - 0000009F] Direct memory access controller
[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000A4 - 000000A5] Programmable interrupt controller
[000000A8 - 000000A9] Programmable interrupt controller
[000000AC - 000000AD] Programmable interrupt controller
[000000B0 - 000000B1] Programmable interrupt controller
[000000B2 - 000000B3] Motherboard resources
[000000B4 - 000000B5] Programmable interrupt controller
[000000B8 - 000000B9] Programmable interrupt controller
[000000BC - 000000BD] Programmable interrupt controller
[000000C0 - 000000DF] Direct memory access controller
[000000E0 - 000000EF] Motherboard resources
[000000F0 - 000000F0] Numeric data processor
[00000295 - 000002A4] Motherboard resources
[000002F8 - 000002FF] Communications Port (COM2)
[000003B0 - 000003BB] Intel(R) Graphics Media Accelerator 3600 Series
[000003C0 - 000003DF] Intel(R) Graphics Media Accelerator 3600 Series
[000003F8 - 000003FF] Communications Port (COM1)
[00000400 - 0000047F] Motherboard resources
[00000400 - 0000047F] Motherboard resources
[000004D0 - 000004D1] Motherboard resources
[000004D0 - 000004D1] Programmable interrupt controller
[00000500 - 0000053F] Motherboard resources
[00000500 - 0000057F] Motherboard resources
[00000600 - 0000061F] Motherboard resources
[00000680 - 0000069F] Motherboard resources
[000006A0 - 000006AF] Motherboard resources
[000006B0 - 000006EF] Motherboard resources
[00000D00 - 0000FFFF] PCI bus
[00001000 - 0000100F] Motherboard resources
[0000E000 - 0000EFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
[0000F000 - 0000F01F] Intel(R) N10/ICH7 Family SMBus Controller - 27DA
[0000F020 - 0000F02F] Intel(R) ICH7R/DH SATA AHCI Controller
[0000F040 - 0000F05F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CB
[0000F060 - 0000F07F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CA
[0000F080 - 0000F09F] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C9
[0000F0A0 - 0000F0BF] Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C8
[0000F0C0 - 0000F0C3] Intel(R) ICH7R/DH SATA AHCI Controller
[0000F0D0 - 0000F0D7] Intel(R) ICH7R/DH SATA AHCI Controller
[0000F0E0 - 0000F0E3] Intel(R) ICH7R/DH SATA AHCI Controller
[0000F0F0 - 0000F0F7] Intel(R) ICH7R/DH SATA AHCI Controller
[0000F100 - 0000F107] Intel(R) Graphics Media Accelerator 3600 Series
[0000FFFF - 0000FFFF] Motherboard resources
[0000FFFF - 0000FFFF] Motherboard resources

4.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

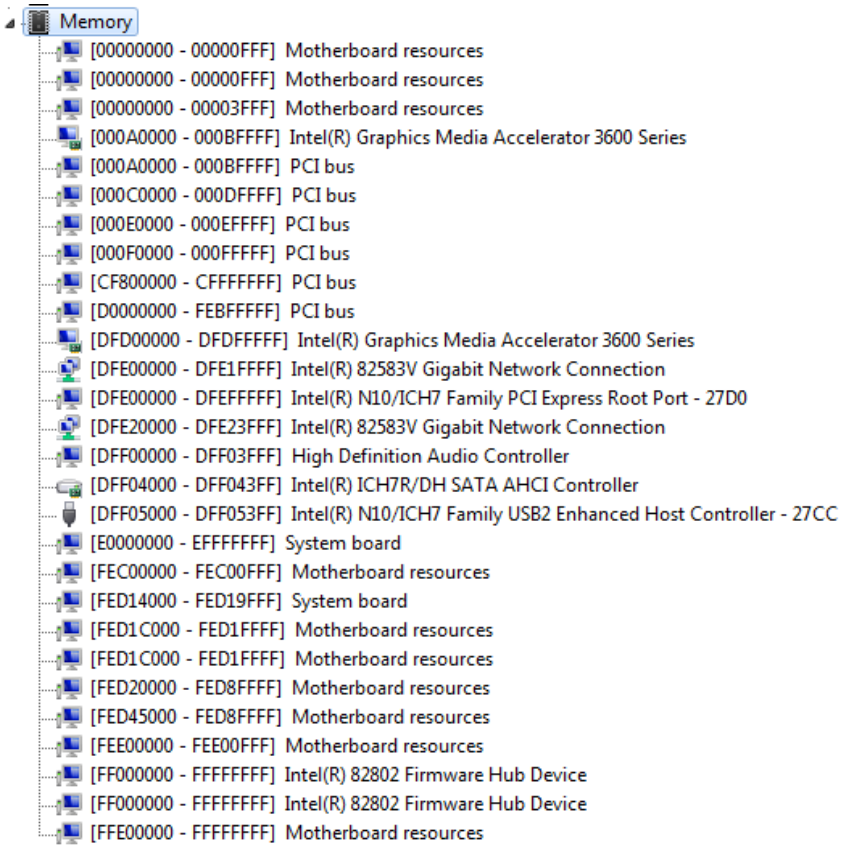

Interrupt request (IRQ)
(ISA) 0x00000000 (00) System timer
(ISA) 0x00000003 (03) Communications Port (COM2)
(ISA) 0x00000004 (04) Communications Port (COM1)
(ISA) 0x00000008 (08) System CMOS/real time clock
(ISA) 0x0000000D (13) Numeric data processor
(ISA) 0x00000051 (81) Microsoft ACPI-Compliant System
(ISA) 0x00000052 (82) Microsoft ACPI-Compliant System
(ISA) 0x00000053 (83) Microsoft ACPI-Compliant System
(ISA) 0x00000054 (84) Microsoft ACPI-Compliant System
(ISA) 0x00000055 (85) Microsoft ACPI-Compliant System
(ISA) 0x00000056 (86) Microsoft ACPI-Compliant System
(ISA) 0x00000057 (87) Microsoft ACPI-Compliant System
(ISA) 0x00000058 (88) Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89) Microsoft ACPI-Compliant System
(ISA) 0x0000005A (90) Microsoft ACPI-Compliant System
(ISA) 0x0000005B (91) Microsoft ACPI-Compliant System
(ISA) 0x0000005C (92) Microsoft ACPI-Compliant System
(ISA) 0x0000005D (93) Microsoft ACPI-Compliant System
(ISA) 0x0000005E (94) Microsoft ACPI-Compliant System
(ISA) 0x0000005F (95) Microsoft ACPI-Compliant System
(ISA) 0x00000060 (96) Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97) Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98) Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99) Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100) Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101) Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102) Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103) Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104) Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105) Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106) Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107) Microsoft ACPI-Compliant System
(ISA) 0x0000006C (108) Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109) Microsoft ACPI-Compliant System
(ISA) 0x0000006E (110) Microsoft ACPI-Compliant System
(ISA) 0x0000006F (111) Microsoft ACPI-Compliant System
(ISA) 0x00000070 (112) Microsoft ACPI-Compliant System
(ISA) 0x00000071 (113) Microsoft ACPI-Compliant System


(ISA) 0x00000072 (114) Microsoft ACPI-Compliant System
(ISA) 0x00000073 (115) Microsoft ACPI-Compliant System
(ISA) 0x00000074 (116) Microsoft ACPI-Compliant System
(ISA) 0x00000075 (117) Microsoft ACPI-Compliant System
(ISA) 0x00000076 (118) Microsoft ACPI-Compliant System
(ISA) 0x00000077 (119) Microsoft ACPI-Compliant System
(ISA) 0x00000078 (120) Microsoft ACPI-Compliant System
(ISA) 0x00000079 (121) Microsoft ACPI-Compliant System
(ISA) 0x0000007A (122) Microsoft ACPI-Compliant System
(ISA) 0x0000007B (123) Microsoft ACPI-Compliant System
(ISA) 0x0000007C (124) Microsoft ACPI-Compliant System
(ISA) 0x0000007D (125) Microsoft ACPI-Compliant System
(ISA) 0x0000007E (126) Microsoft ACPI-Compliant System
(ISA) 0x0000007F (127) Microsoft ACPI-Compliant System
(ISA) 0x00000080 (128) Microsoft ACPI-Compliant System
(ISA) 0x00000081 (129) Microsoft ACPI-Compliant System
(ISA) 0x00000082 (130) Microsoft ACPI-Compliant System
(ISA) 0x00000083 (131) Microsoft ACPI-Compliant System
(ISA) 0x00000084 (132) Microsoft ACPI-Compliant System
(ISA) 0x00000085 (133) Microsoft ACPI-Compliant System
(ISA) 0x00000086 (134) Microsoft ACPI-Compliant System
(ISA) 0x00000087 (135) Microsoft ACPI-Compliant System
(ISA) 0x00000088 (136) Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137) Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138) Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139) Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140) Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141) Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142) Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143) Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144) Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145) Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146) Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147) Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148) Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149) Microsoft ACPI-Compliant System
(ISA) 0x00000096 (150) Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151) Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152) Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153) Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154) Microsoft ACPI-Compliant System
(ISA) 0x0000009B (155) Microsoft ACPI-Compliant System


(ISA) 0x0000009C (156) Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157) Microsoft ACPI-Compliant System
(ISA) 0x0000009E (158) Microsoft ACPI-Compliant System
(ISA) 0x0000009F (159) Microsoft ACPI-Compliant System
(ISA) 0x000000A0 (160) Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161) Microsoft ACPI-Compliant System
(ISA) 0x000000A2 (162) Microsoft ACPI-Compliant System
(ISA) 0x000000A3 (163) Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164) Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165) Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166) Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167) Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168) Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169) Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170) Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171) Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172) Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173) Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174) Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175) Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176) Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177) Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178) Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179) Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180) Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181) Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182) Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183) Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184) Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185) Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186) Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187) Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188) Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189) Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190) Microsoft ACPI-Compliant System
(PCI) 0x0000000B (11) Intel(R) N10/ICH7 Family SMBus Controller - 27DA
(PCI) 0x00000010 (16) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
(PCI) 0x00000010 (16) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CB
(PCI) 0x00000011 (17) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
(PCI) 0x00000012 (18) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D4
(PCI) 0x00000012 (18) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27CA
(PCI) 0x00000013 (19) Intel(R) ICH7R/DH SATA AHCI Controller
(PCI) 0x00000013 (19) Intel(R) N10/ICH7 Family PCI Express Root Port - 27D6
(PCI) 0x00000013 (19) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C9
(PCI) 0x00000016 (22) High Definition Audio Controller
(PCI) 0x00000017 (23) Intel(R) N10/ICH7 Family USB Universal Host Controller - 27C8
(PCI) 0x00000017 (23) Intel(R) N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
(PCI) 0xFFFFFFFD (-3) Intel(R) 82583V Gigabit Network Connection
(PCI) 0xFFFFFFFE (-2) Intel(R) Graphics Media Accelerator 3600 Series

4.6 Memory Map

The memory mapping list is shown as follows:


Memory
[00000000 - 00000FFF] Motherboard resources
[00000000 - 00000FFF] Motherboard resources
[00000000 - 00003FFF] Motherboard resources
[000A0000 - 000BFFFF] Intel(R) Graphics Media Accelerator 3600 Series
[000A0000 - 000BFFFF] PCI bus
[000C0000 - 000DFFFF] PCI bus
[000E0000 - 000EFFFF] PCI bus
[000F0000 - 000FFFFF] PCI bus
[CF800000 - CFFFFFFF] PCI bus
[D0000000 - FEBFFFFF] PCI bus
[DFD00000 - DFDFFFFF] Intel(R) Graphics Media Accelerator 3600 Series
[DFE00000 - DFE1FFFF] Intel(R) 82583V Gigabit Network Connection
[DFE00000 - DFEFFFFF] Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
[DFE20000 - DFE23FFF] Intel(R) 82583V Gigabit Network Connection
[DFF00000 - DFF03FFF] High Definition Audio Controller
[DFF04000 - DFF043FF] Intel(R) ICH7R/DH SATA AHCI Controller
[DFF05000 - DFF053FF] Intel(R) N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
[E0000000 - EFFFFFFF] System board
[FEC00000 - FEC00FFF] Motherboard resources
[FED14000 - FED19FFF] System board
[FED1C000 - FED1FFFF] Motherboard resources
[FED1C000 - FED1FFFF] Motherboard resources
[FED20000 - FED8FFFF] Motherboard resources
[FED45000 - FED8FFFF] Motherboard resources
[FEE00000 - FEE00FFF] Motherboard resources
[FF000000 - FFFFFFFF] Intel(R) 82802 Firmware Hub Device
[FF000000 - FFFFFFFF] Intel(R) 82802 Firmware Hub Device
[FFE00000 - FFFFFFFF] Motherboard resources

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Chapter 5
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

5.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

Note: ***If your computer can not boot after making and saving system changes with Setup, you can restore BIOS optimal defaults by setting JP4 (see section 2.4.4).***

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

5.2 Navigation Keys

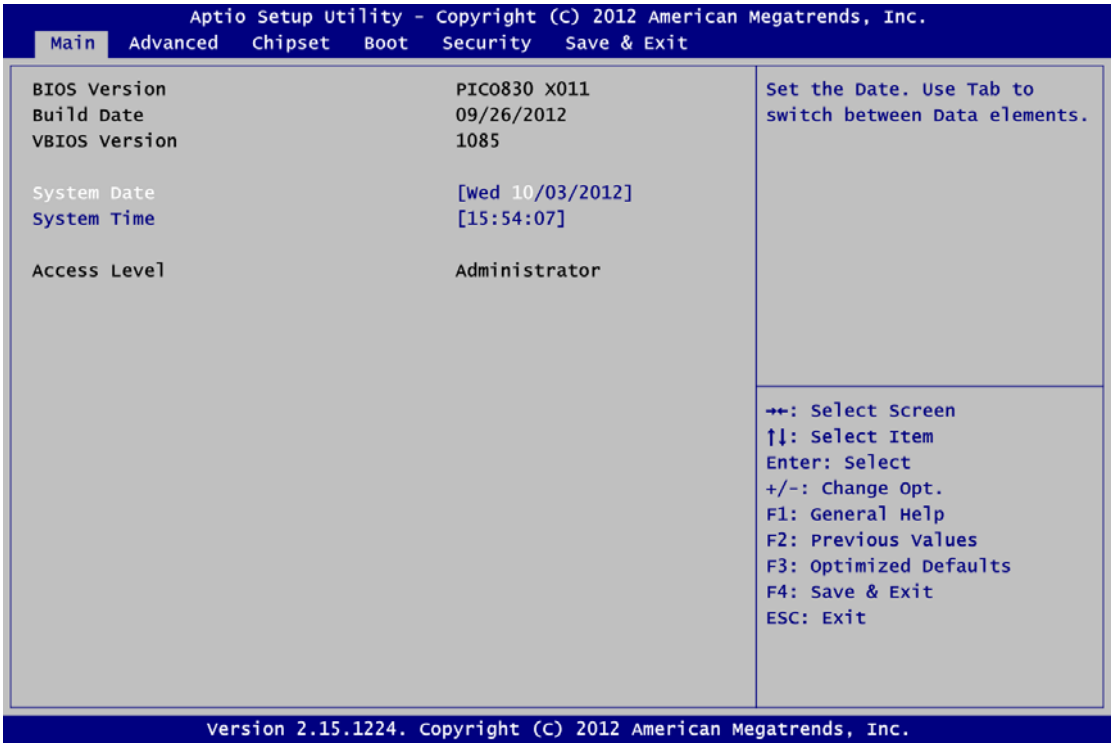
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

Note: ***Some of the navigation keys differ from one screen to another.***

Hot Keys	Description
→← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

5.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



- **System Date/Time**
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

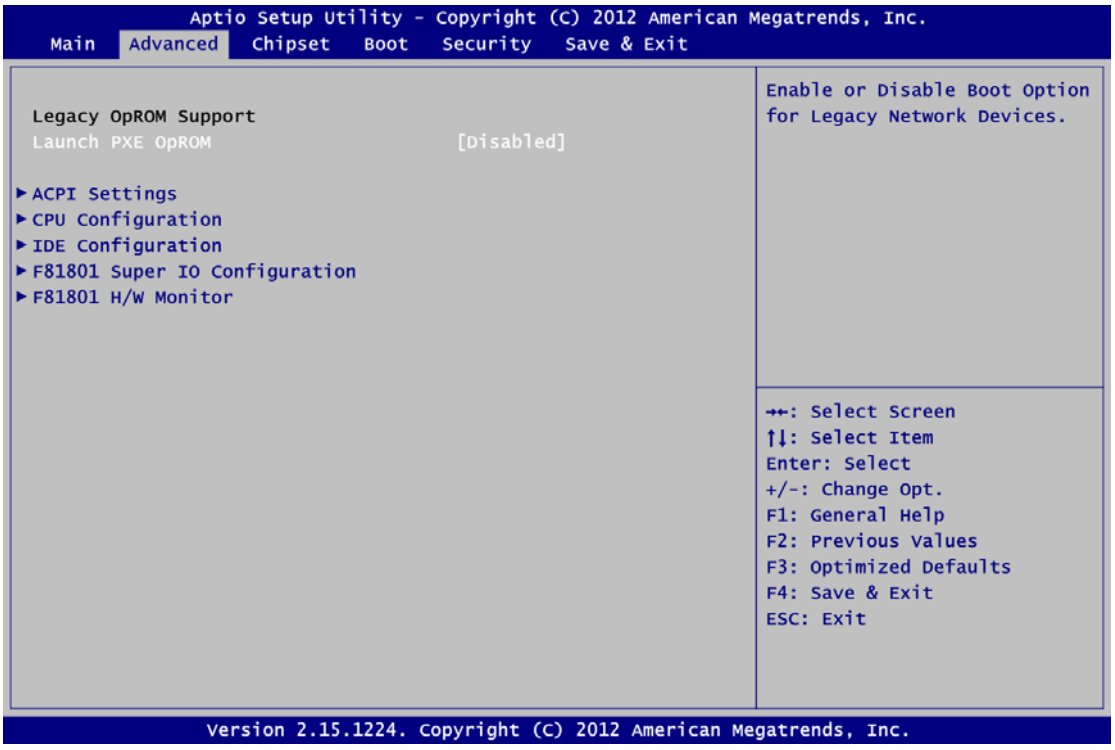
5.4 Advanced Menu

- **Launch PXE OpROM**
  Use this item to enable or disable the boot ROM function of the onboard LAN chip when the system boots up.

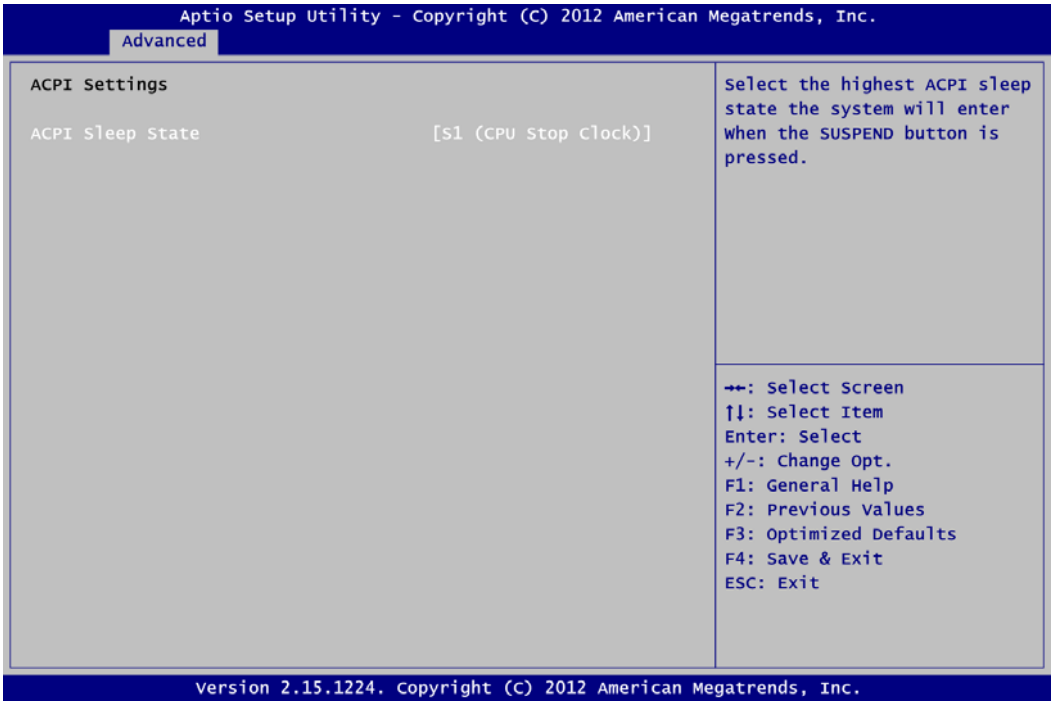
The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► ACPI Settings
- ► CPU Configuration
- ► IDE Configuration
- ► F81801 Super IO Configuration
- ► F81801 H/W Monitor

For items marked with "►", please press <Enter> for more options.

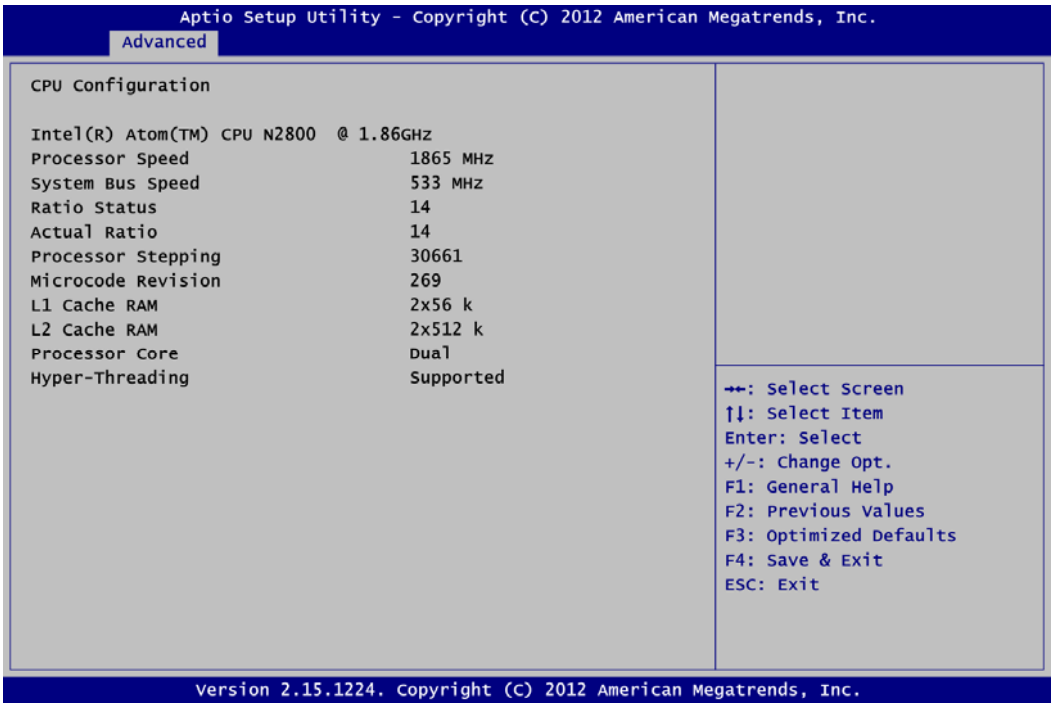


- **ACPI Settings**

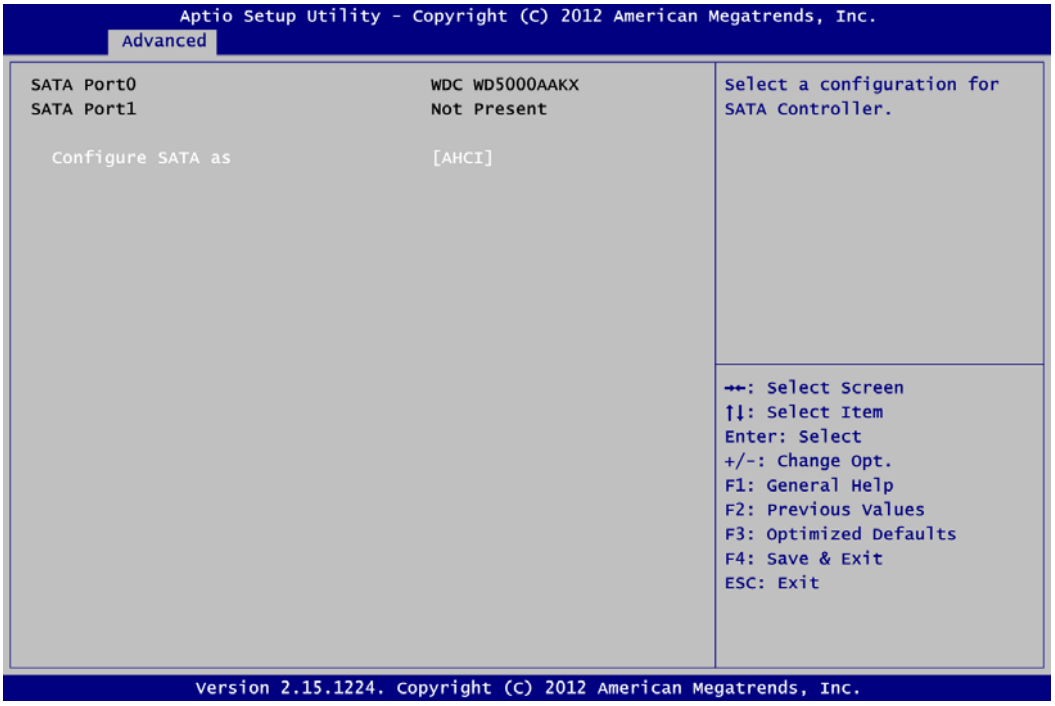

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
ACPI Settings
ACPI Sleep State [S1 (CPU Stop Clock)]
Select the highest ACPI sleep state the system will enter When the SUSPEND button is pressed.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

ACPI Sleep State
When the sleep button is pressed, the system will be in the ACPI sleep state. The default is S1 (CPU Stop Clock).

- **CPU Configuration**
This screen shows the CPU Configuration.

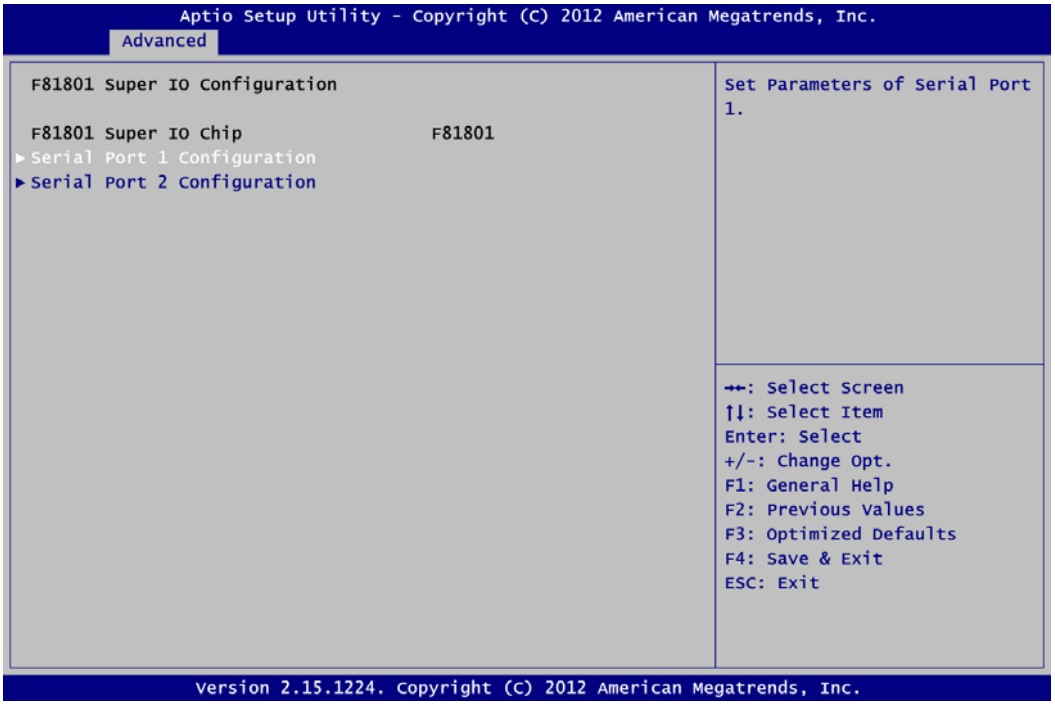


- **IDE Configuration**
  In the IDE Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.

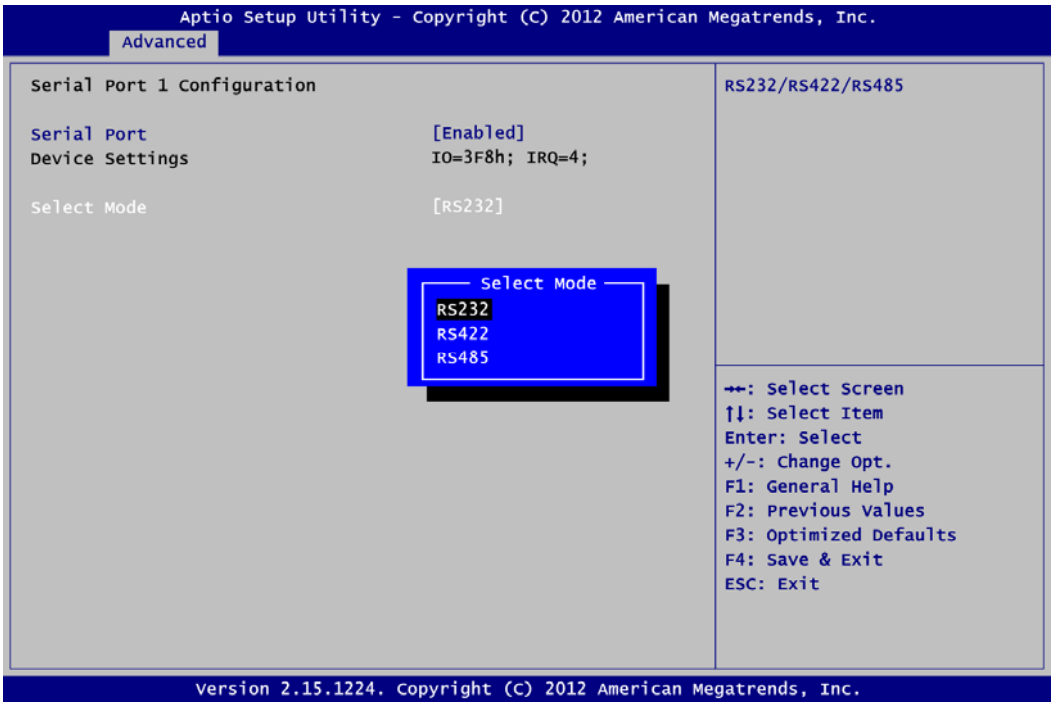


Configure SATA as
Determine how SATA controller(s) operate. Operation mode options are IDE Mode and AHCI (Advanced Host Controller Interface) Mode.

- **F81801 Super IO Configuration**
  You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.

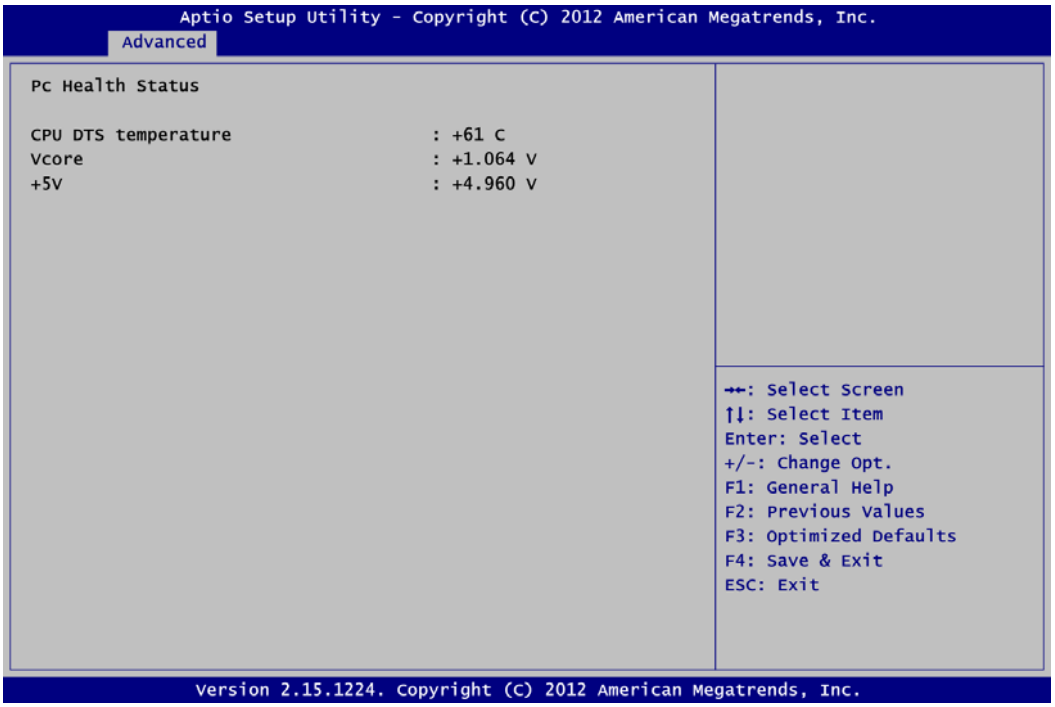

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
F81801 Super IO Configuration
F81801 Super IO Chip F81801
▶ Serial Port 1 Configuration
▶ Serial Port 2 Configuration
Set Parameters of Serial Port 1.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

Serial Port 2 Configuration
Use this option to enable or disable the serial port 2.



Serial Port 1 Configuration
Use this option to enable or disable and set RS-422/RS-485 mode for the serial port 1.

- **F81801 H/W Monitor**
  This screen monitors hardware health status.



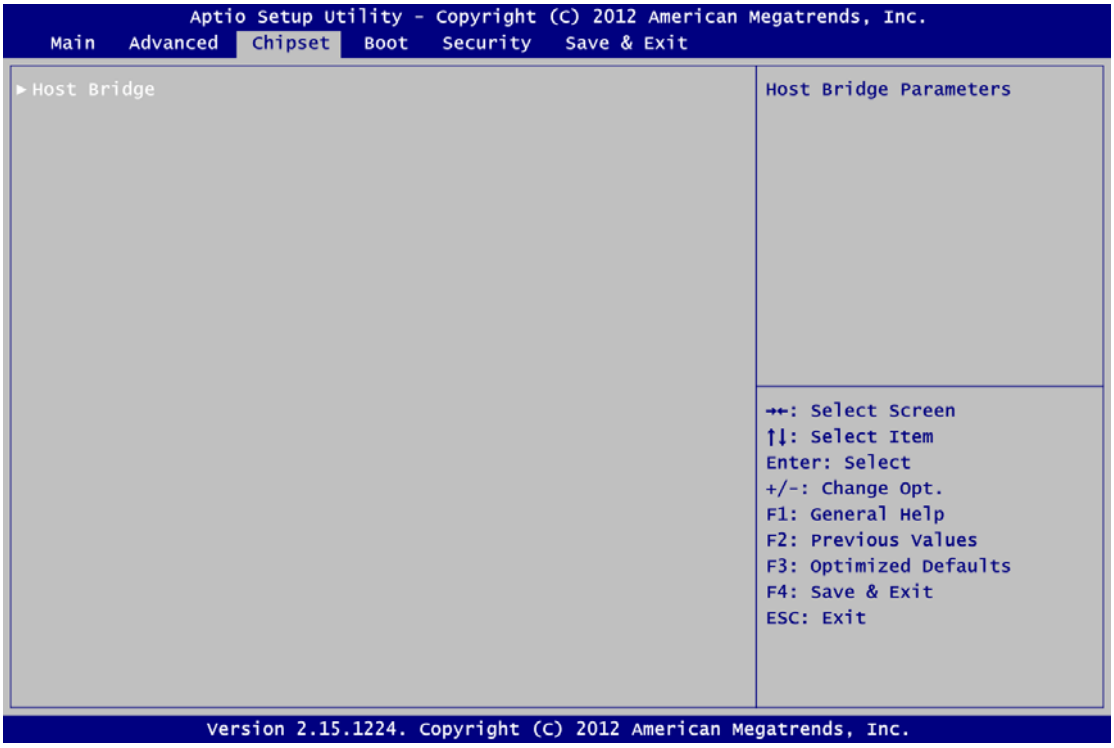
This screen displays the temperature of CPU and system voltages (Vcore and +5V).

5.5 Chipset Menu

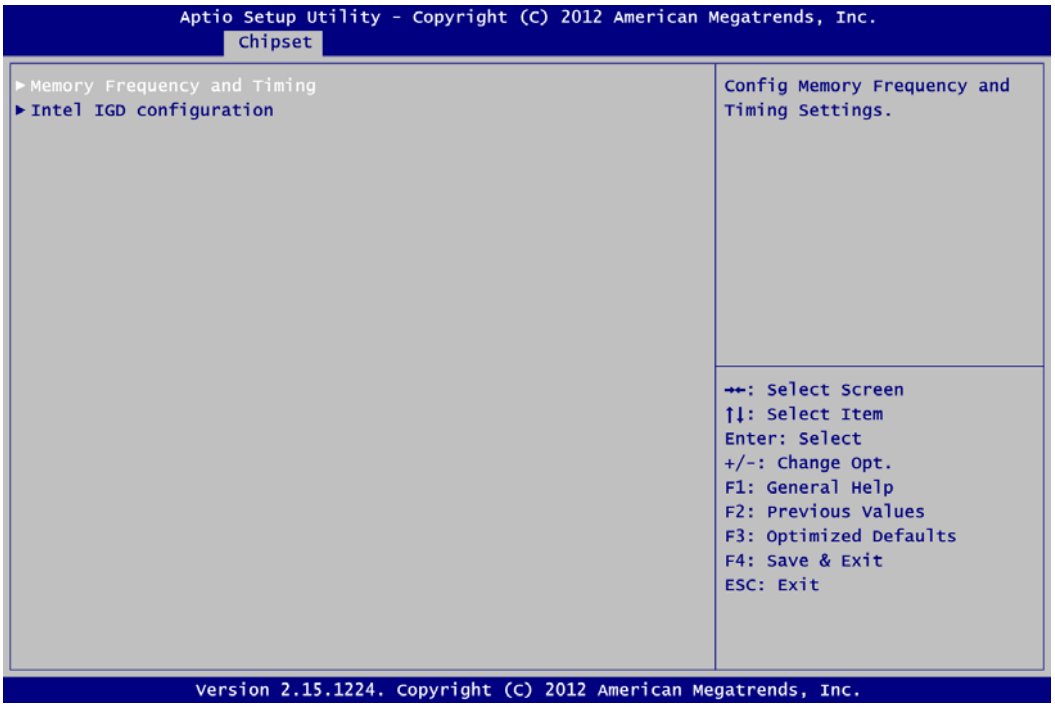
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

► Host Bridge

For items marked with "►", please press <Enter> for more options.



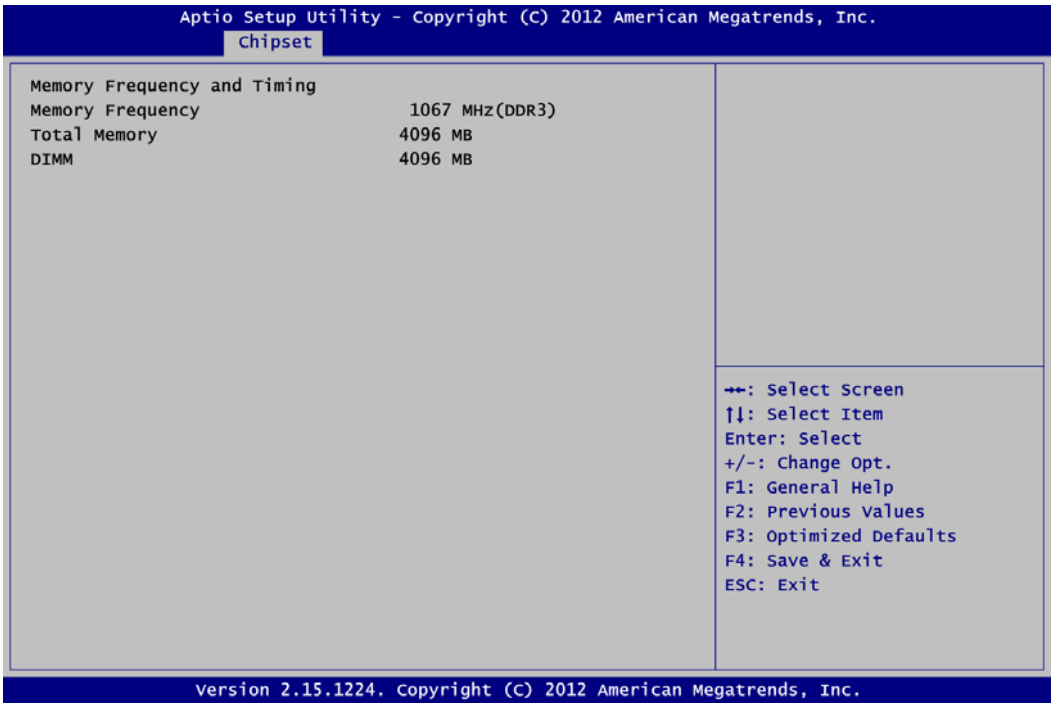
- **Host Bridge**
  This screen allows users to configure parameters of Host Bridge chipset.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
▶ Memory Frequency and Timing
▶ Intel IGD configuration
Config Memory Frequency and Timing Settings.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

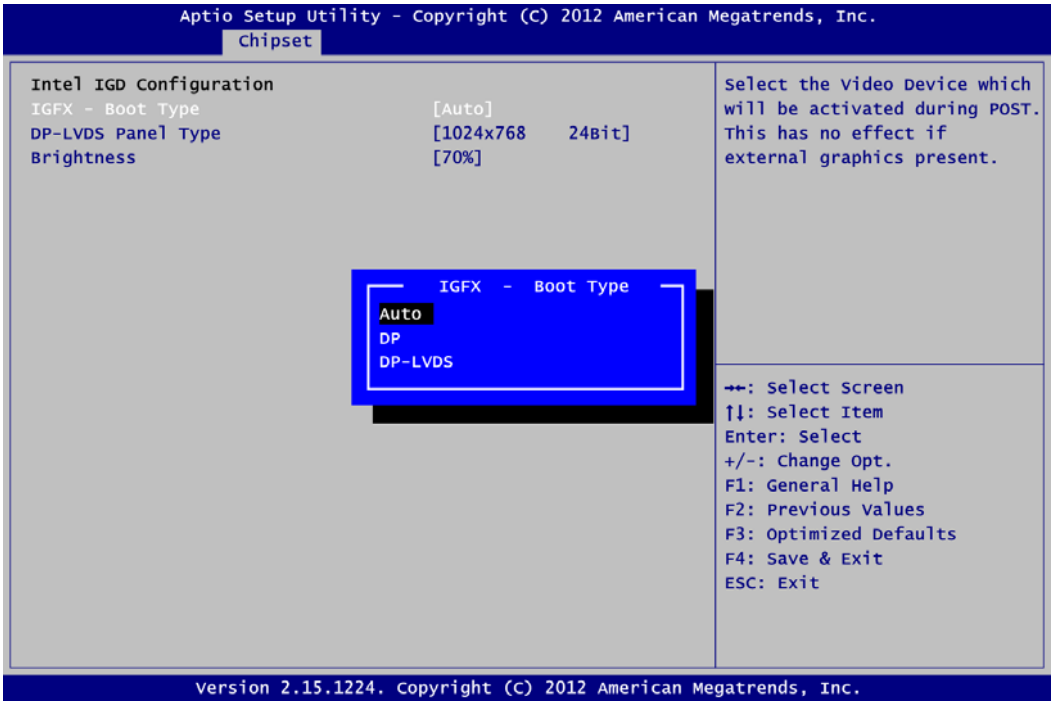
Memory Frequency and Timing
Use this item to refer to the information related to memory frequency.

Intel IGD Configuration
Use this item to configure internal graphics controller.

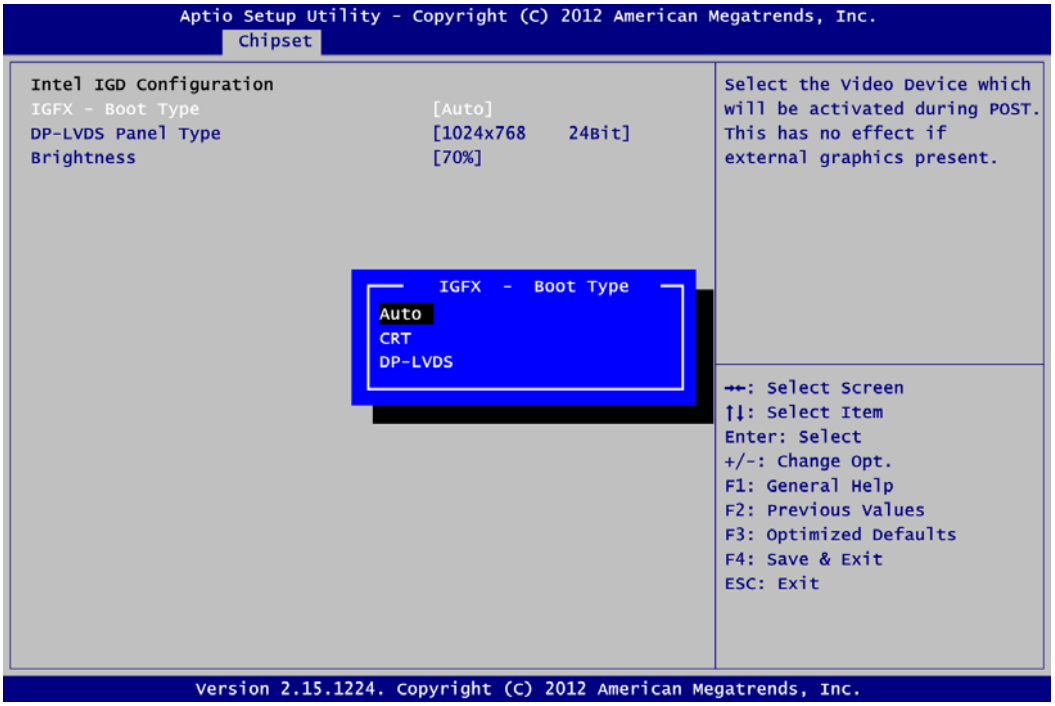
- **Memory Frequency and Timing**
  This screen shows the memory frequency information.



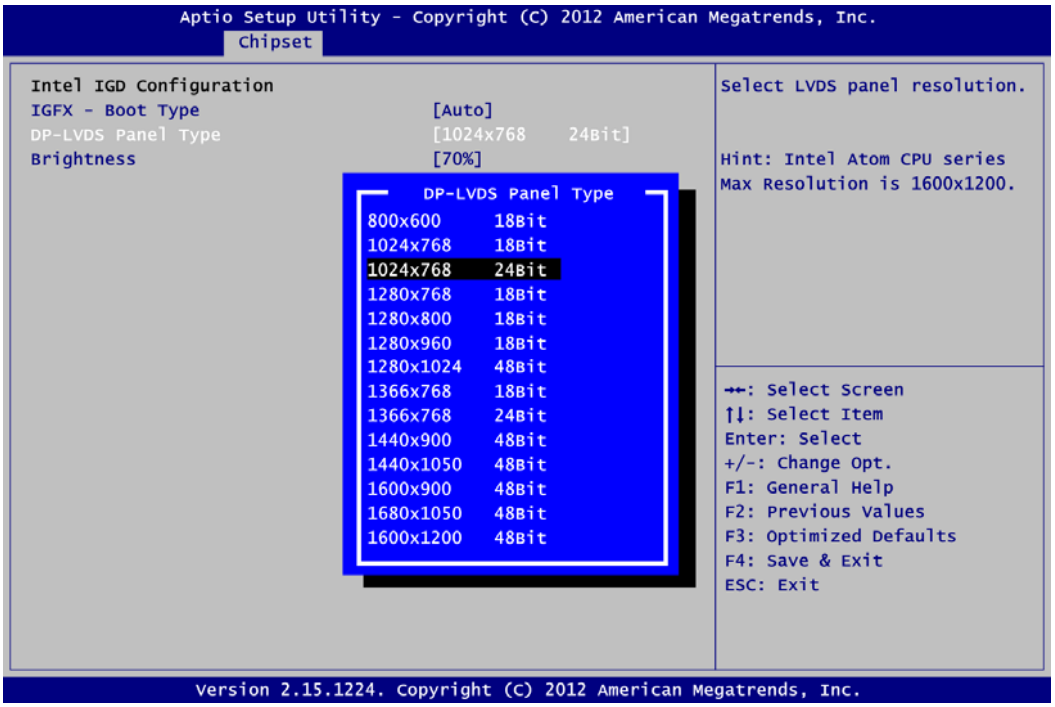
- **Intel IGD Configuration**


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
Intel IGD Configuration
IGFX - Boot Type [Auto]
DP-LVDS Panel Type [1024x768 24Bit]
Brightness [70%]
Select the Video Device which will be activated during POST. This has no effect if external graphics present.
IGFX - Boot Type
Auto
DP
DP-LVDS
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

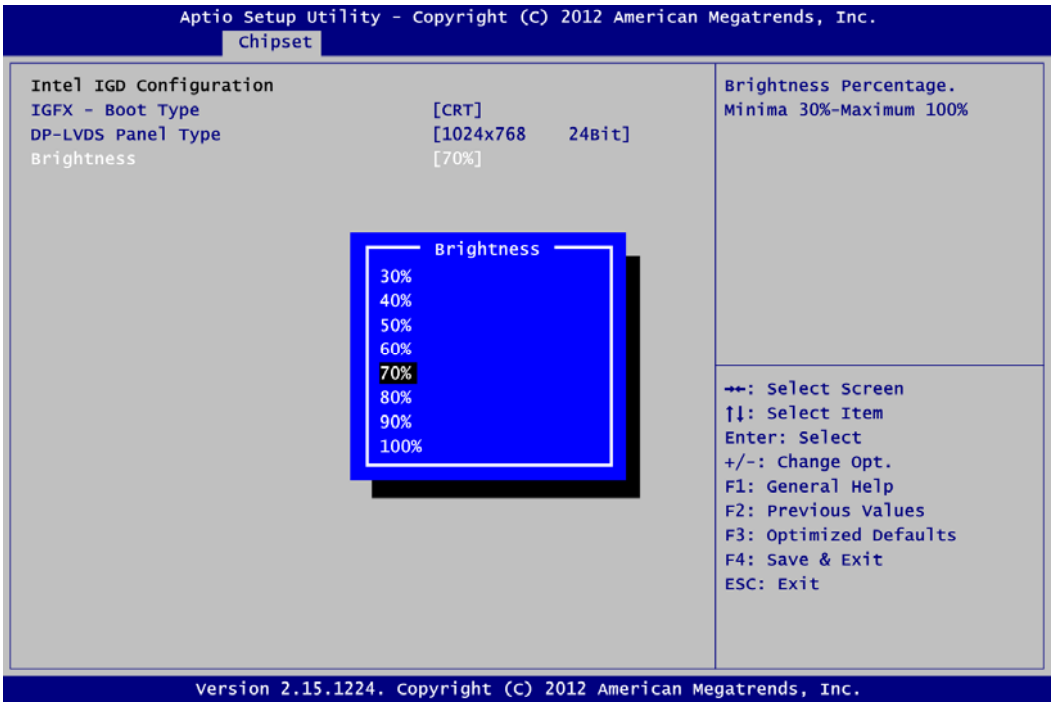
or


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
Intel IGD Configuration
IGFX - Boot Type [Auto]
DP-LVDS Panel Type [1024x768 24Bit]
Brightness [70%]
Select the Video Device which will be activated during POST. This has no effect if external graphics present.
IGFX - Boot Type
Auto
CRT
DP-LVDS
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

IGFX – Boot Type
Select the video device which will be activated during POST (Power-On Self Test). This has no effect if external graphics present.



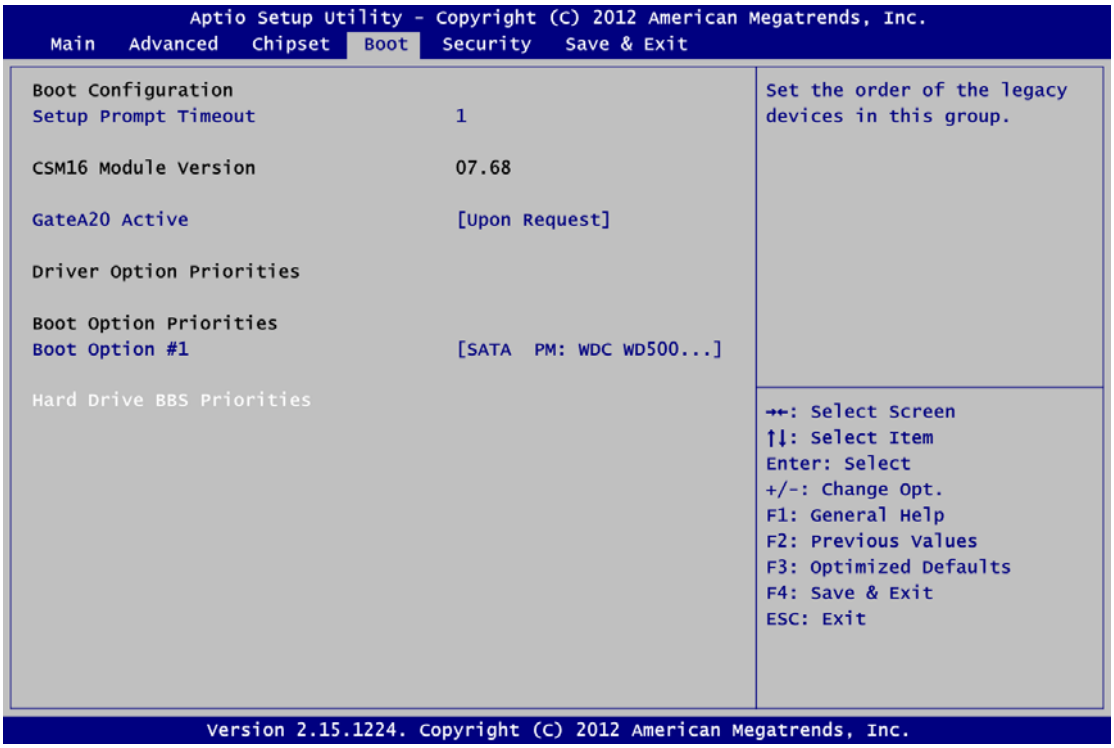
DP-LVDS Panel Type
Select LVDS panel resolution.



Brightness
Select the brightness percentage of LVDS panel. Its range is from 30% to 100%. The default is 70%.

5.6 Boot Menu

The Boot menu allows users to change boot options of the system.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Setup Prompt Timeout 1
CSM16 Module Version 07.68
GateA20 Active [Upon Request]
Driver Option Priorities
Boot Option Priorities
Boot Option #1 [SATA PM: WDC WD500...]
Hard Drive BBS Priorities
Set the order of the legacy devices in this group.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

- **GateA20 Active**
  If Upon Request is selected, GA20 can be disabled using BIOS services. If Always is selected, disabling G20 is not allowed; this option is useful when any RT code is executed above 1MB.

- **Boot Option Priorities**
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

- **Hard Drive BBS Priorities**
  Set the order of the legacy devices in this group.

5.7 Security Menu

The Security menu allows users to change the security settings for the system.

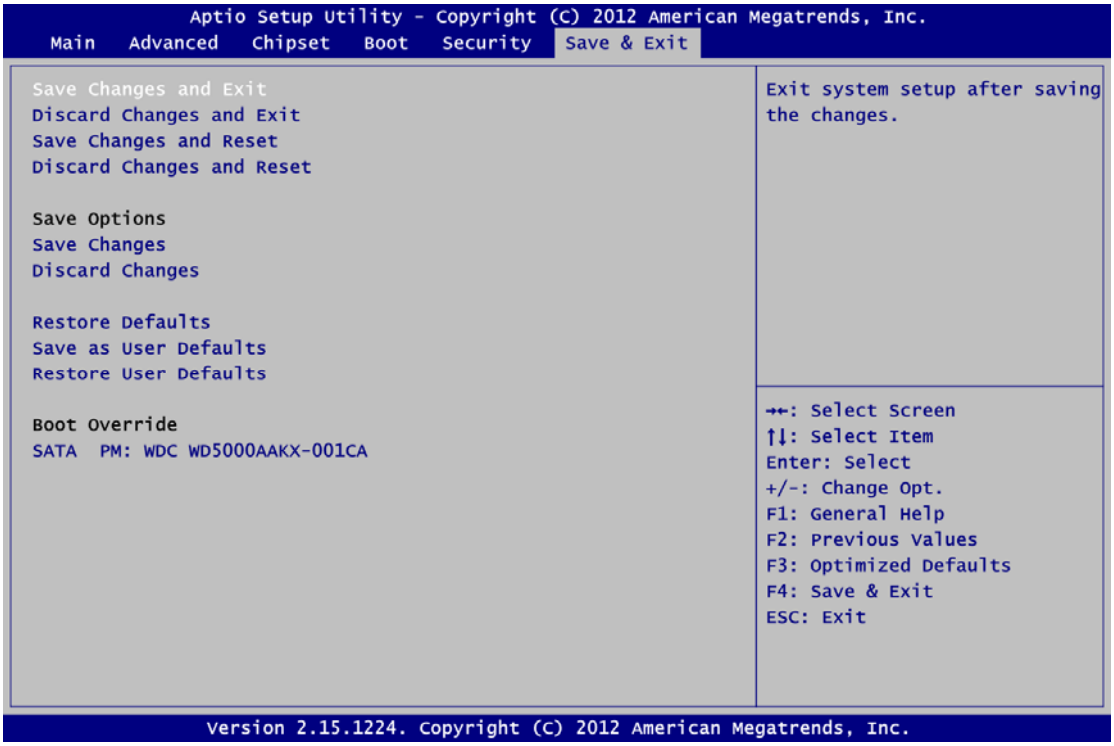
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1224. Copyright (C) 2012 American Megatrends, Inc.

- **Administrator Password**
  This item indicates whether an administrator password has been set (installed or uninstalled).

- **User Password**
  This item indicates whether an user password has been set (installed or uninstalled).

5.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

- **Save Changes and Reset**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

- **Save Changes**
  When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

- **Restore Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

- **Save as User Defaults**
  Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

- **Restore User Defaults**
  It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

- **Boot Override**
  Select a drive to immediately boot that device regardless of the current boot order.

Chapter 6
Drivers Installation

The device drivers are located on the product information CD that comes with the PICO830 Series package. The auto-run function of drivers will guide you to install the utilities and device drivers under Windows system. You can follow the onscreen instructions to install these devices:

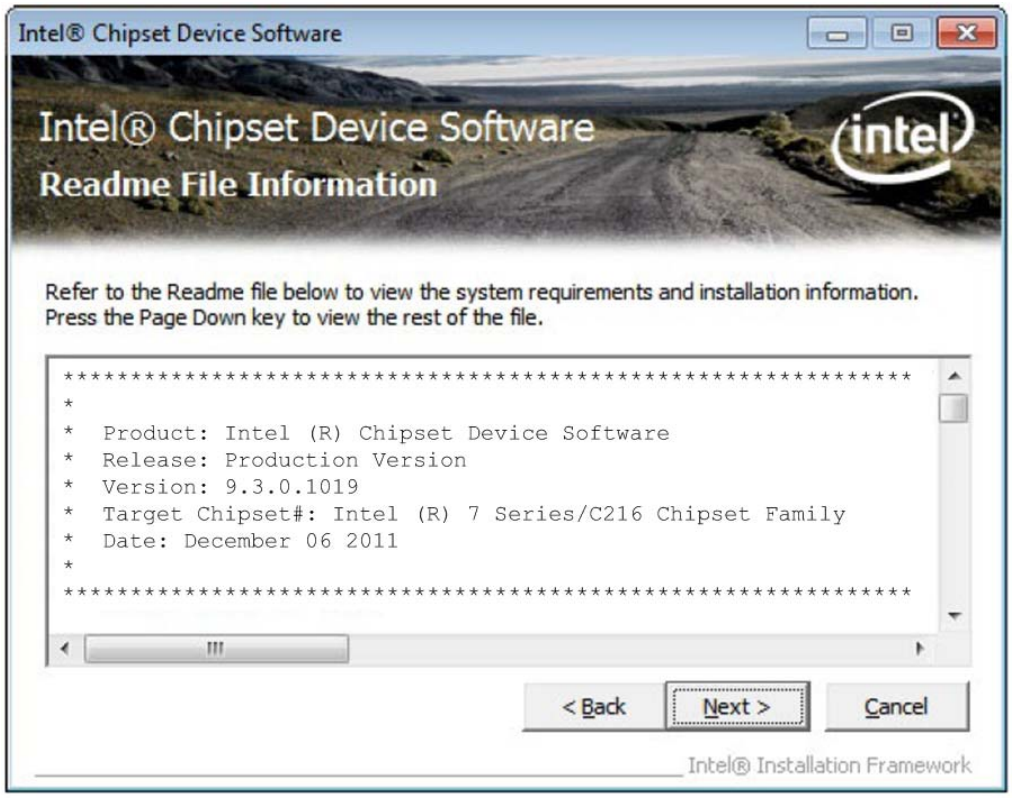
- Chipset
- Graphics
- Ethernet
- Audio
- AHCI

6.1 Installing Chipset Driver

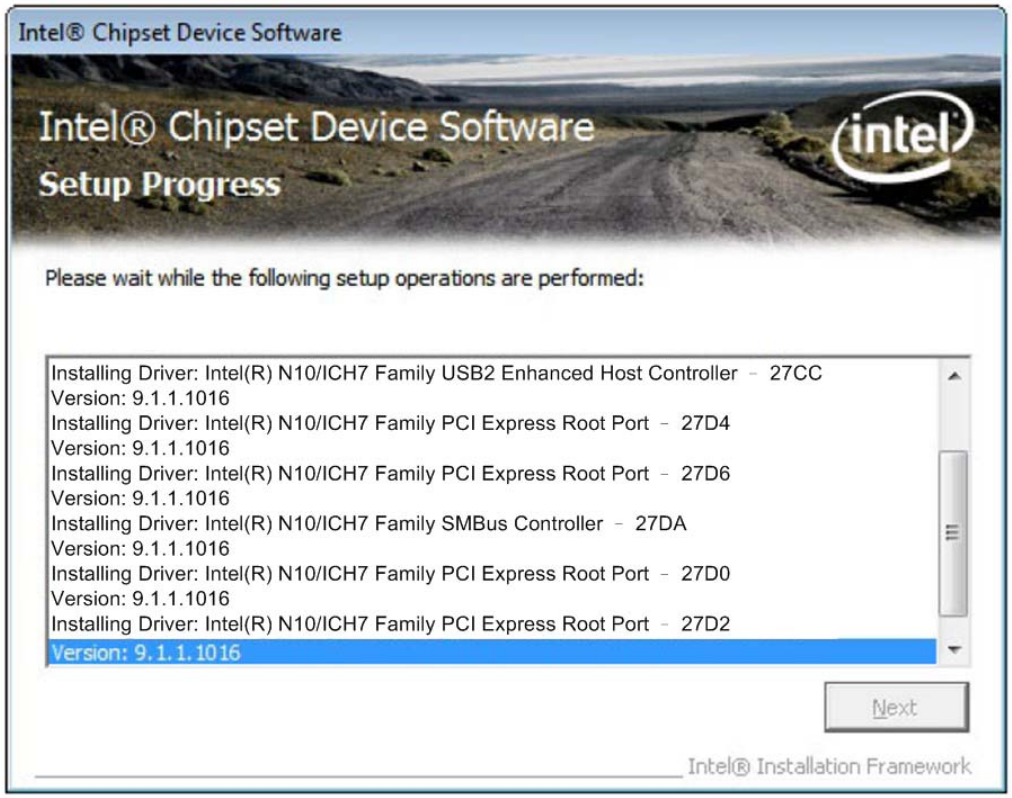
1. Run the infinst_autol.exe program from the driver directory in product information CD. Click “Next” to next step.

Intel® Chipset Device Software
Intel® Chipset Device Software
intel
Welcome to the Setup Program
This setup program will install the Intel® Chipset Device Software onto this computer. It is strongly recommended that you exit all programs before continuing.
< Back
Next >
Cancel
Intel® Installation Framework

2. A Readme File Information screen appears to show you the system requirements and installation information. Click “Next” to next step.


Intel® Chipset Device Software
Intel® Chipset Device Software
Readme File Information
Refer to the Readme file below to view the system requirements and installation information.
Press the Page Down key to view the rest of the file.
****
* Product: Intel (R) Chipset Device Software
* Release: Production Version
* Version: 9.3.0.1019
* Target Chipset#: Intel (R) 7 Series/C216 Chipset Family
* Date: December 06 2011
*
****
< Back
Next >
Cancel
Intel® Installation Framework

3. Please wait while setup processes the following operations.


Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Progress
Please wait while the following setup operations are performed:
Installing Driver: Intel(R) N10/ICH7 Family USB2 Enhanced Host Controller - 27CC
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family PCI Express Root Port - 27D4
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family PCI Express Root Port - 27D6
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family SMBus Controller - 27DA
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family PCI Express Root Port - 27D0
Version: 9.1.1.1016
Installing Driver: Intel(R) N10/ICH7 Family PCI Express Root Port - 27D2
Version: 9.1.1.1016
Next
Intel® Installation Framework

4. You are suggested to select “Yes, I want to restart this computer now”. Click “Finish” to complete the setup process and reboot.

Intel® Chipset Device Software
Intel® Chipset Device Software
Setup Is Complete
intel
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart this computer now.
No, I will restart this computer later.
Click Finish, then remove any installation media from the drives.
Finish
Intel® Installation Framework

6.2 Installing Graphics Media Accelerator Driver

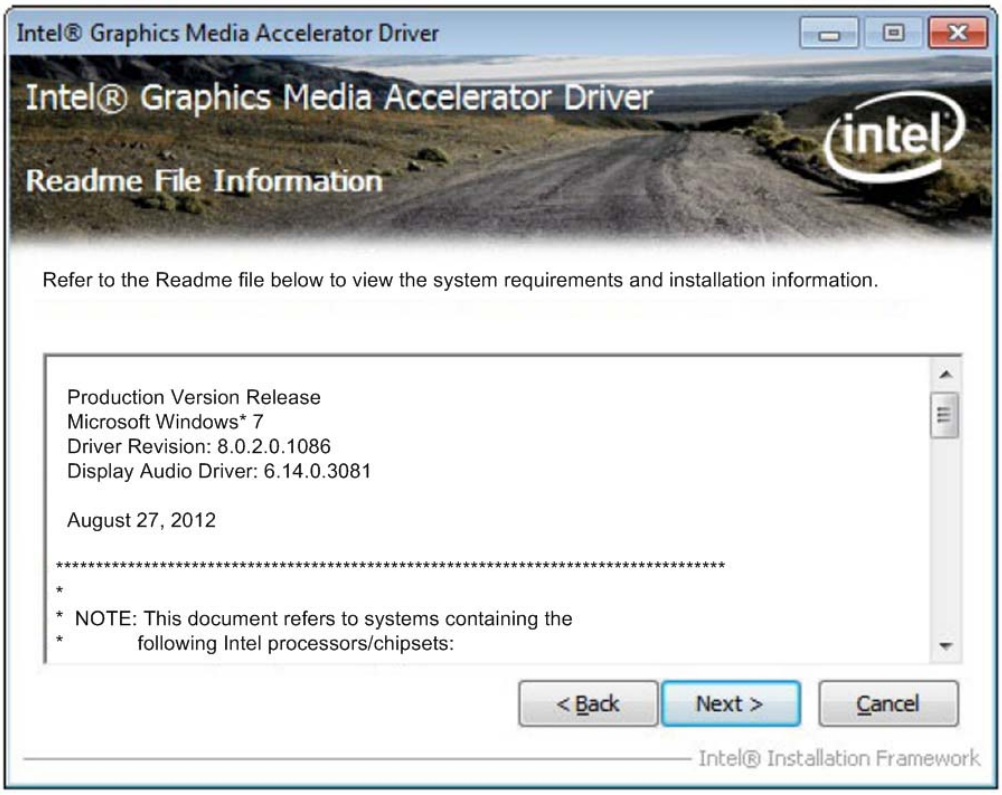
1. Run the setup.exe program from the driver directory in product information CD. Click "Next" to next step.

Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Welcome to the Setup Program
intel
This setup program will install the following components:
- Intel® Graphics Media Accelerator Driver
- Intel® High Definition Audio HDMI Driver
It is strongly recommended that you exit all programs before continuing. Click Next to continue.
Automatically run WinSAT and enable the Windows Aero desktop theme (if supported).
< Back
Next >
Cancel
Intel® Installation Framework

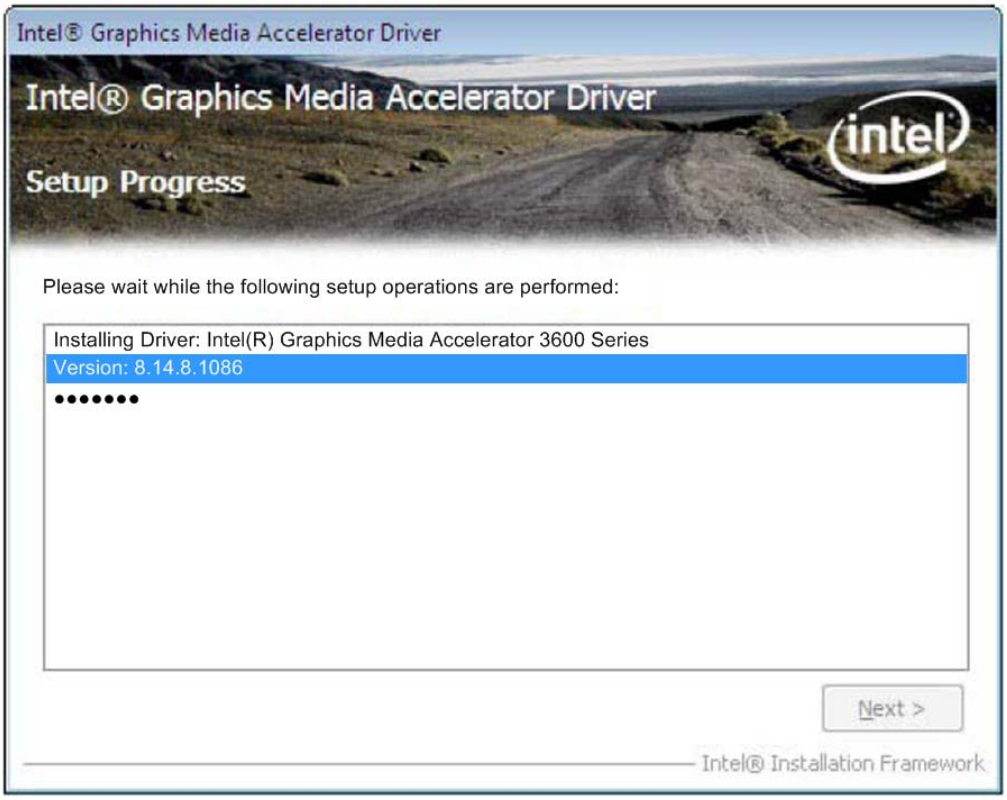
2. When Intel® License Agreement screen appears, please click “Yes” to next step.

Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
License Agreement
intel
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load software from this site or any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
• If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV) or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
• If you are an End-User, then only Exhibit A, the INTEL SOFTWARE LICENSE AGREEMENT, applies.
< Back
Yes
No
Intel® Installation Framework

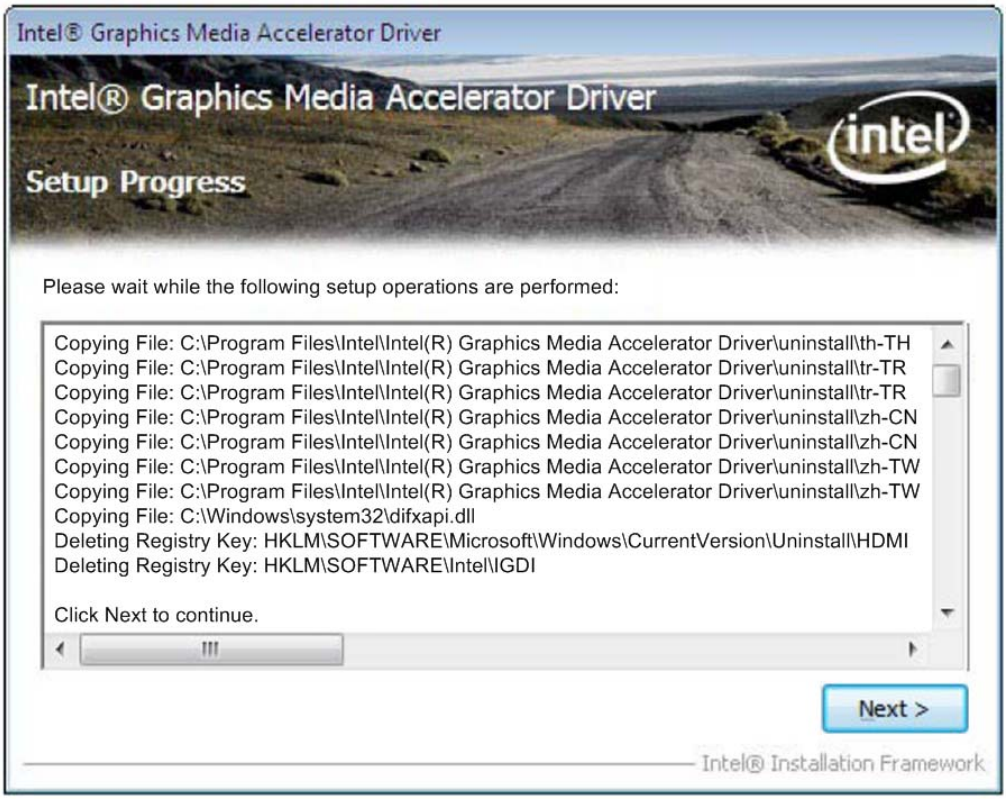
3. A Readme File Information screen appears to show you the system requirements and installation information. Click “Next” to next step.


Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Readme File Information
intel
Refer to the Readme file below to view the system requirements and installation information.
Production Version Release
Microsoft Windows* 7
Driver Revision: 8.0.2.0.1086
Display Audio Driver: 6.14.0.3081
August 27, 2012
****
* NOTE: This document refers to systems containing the
* following Intel processors/chipsets:
< Back
Next >
Cancel
Intel® Installation Framework

4. Please wait while setup processes the following operations.


Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Setup Progress
intel
Please wait while the following setup operations are performed:
Installing Driver: Intel(R) Graphics Media Accelerator 3600 Series
Version: 8.14.8.1086
Next >
Intel® Installation Framework

5. When the following screen appears, please click “Next”.


Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Setup Progress
intel
Please wait while the following setup operations are performed:
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\th-TH
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\tr-TR
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\tr-TR
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\zh-CN
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\zh-CN
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\zh-TW
Copying File: C:\Program Files\Intel\Intel(R) Graphics Media Accelerator Driver\uninstall\zh-TW
Copying File: C:\Windows\system32\difxapi.dll
Deleting Registry Key: HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\HDMI
Deleting Registry Key: HKLM\SOFTWARE\Intel\IGDI
Click Next to continue.
Next >
Intel® Installation Framework

6. You are suggested to select “Yes, I want to restart this computer now”. Click “Finish” to complete the setup process and reboot.

Intel® Graphics Media Accelerator Driver
Intel® Graphics Media Accelerator Driver
Setup Is Complete
intel
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart this computer now.
No, I will restart this computer later.
Click Finish, then remove any installation media from the drives.
Finish
Intel® Installation Framework

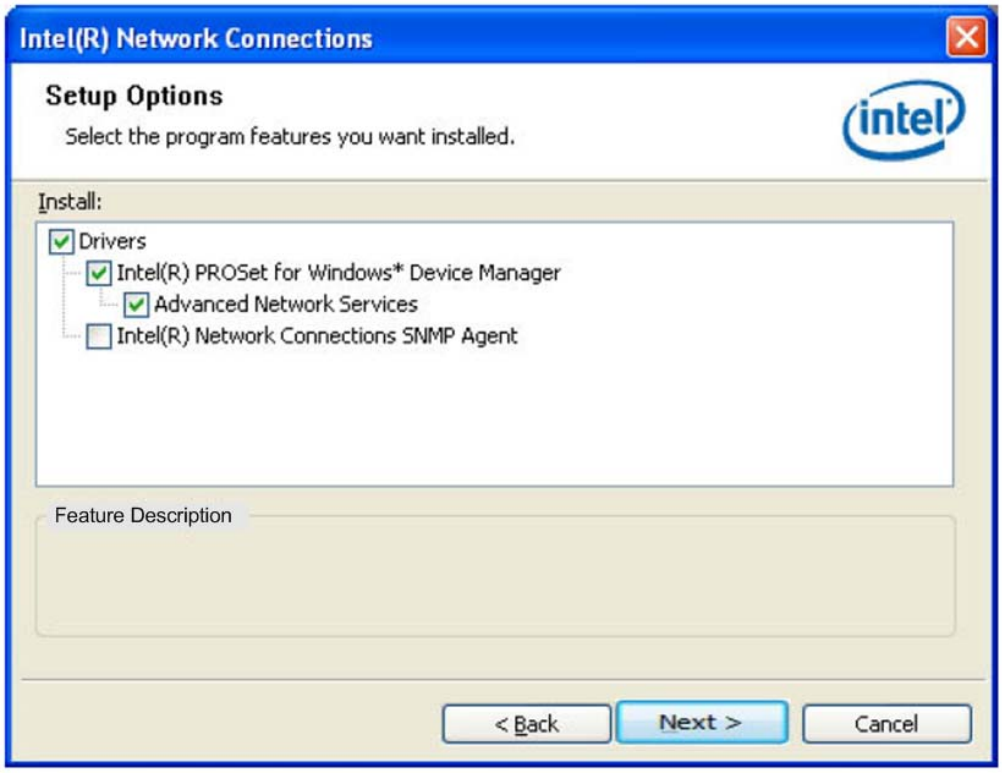
Note: After the computer reboots, the display is in extended mode. Please click hot key <Ctrl+Alt+F1> to switch display back to single mode.

6.3 Installing Ethernet Driver

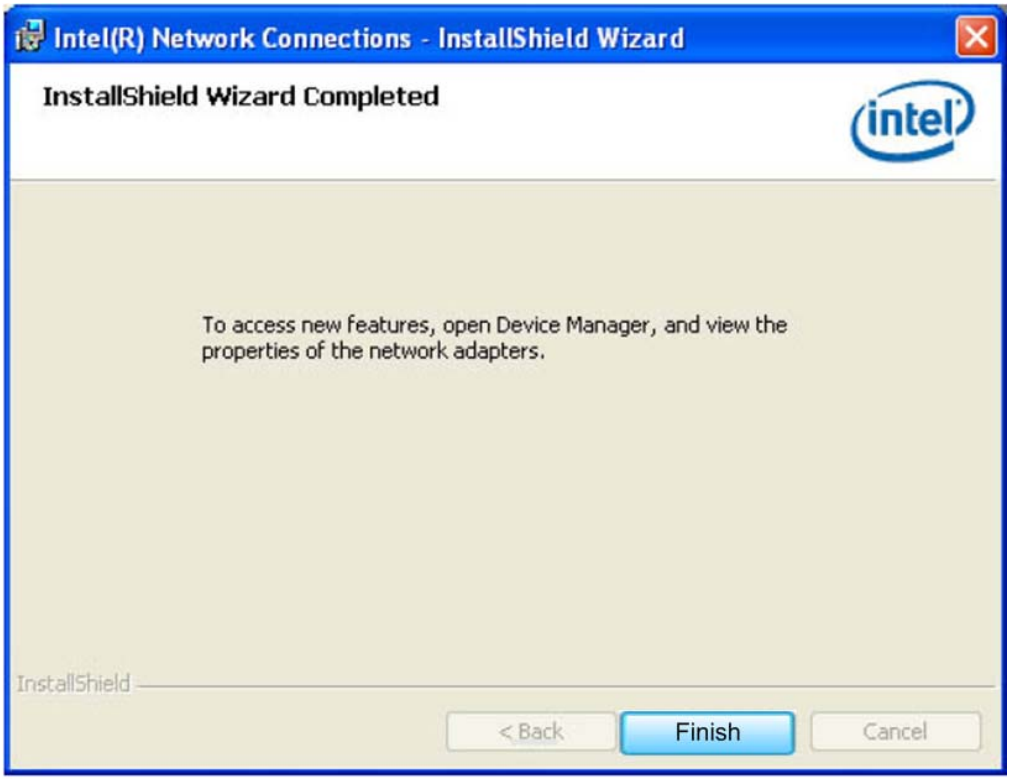
1. Unzip PROWin32 for ethernet driver from the driver directory in product information CD. Click “Next” to start the installation.

Intel(R) Network Connections - InstallShield Wizard
Welcome to the InstallShield Wizard for Intel(R) Network Connections
intel
Install drivers, Intel(R) PROSet for Windows* Device Manager, and Advanced Networking Services.
WARNING: This program is protected by copyright law and International treaties.
InstallShield
< Back
Next >
Cancel

2. When the following screen appears, please select the program features you want to install. Click “Next” to continue.

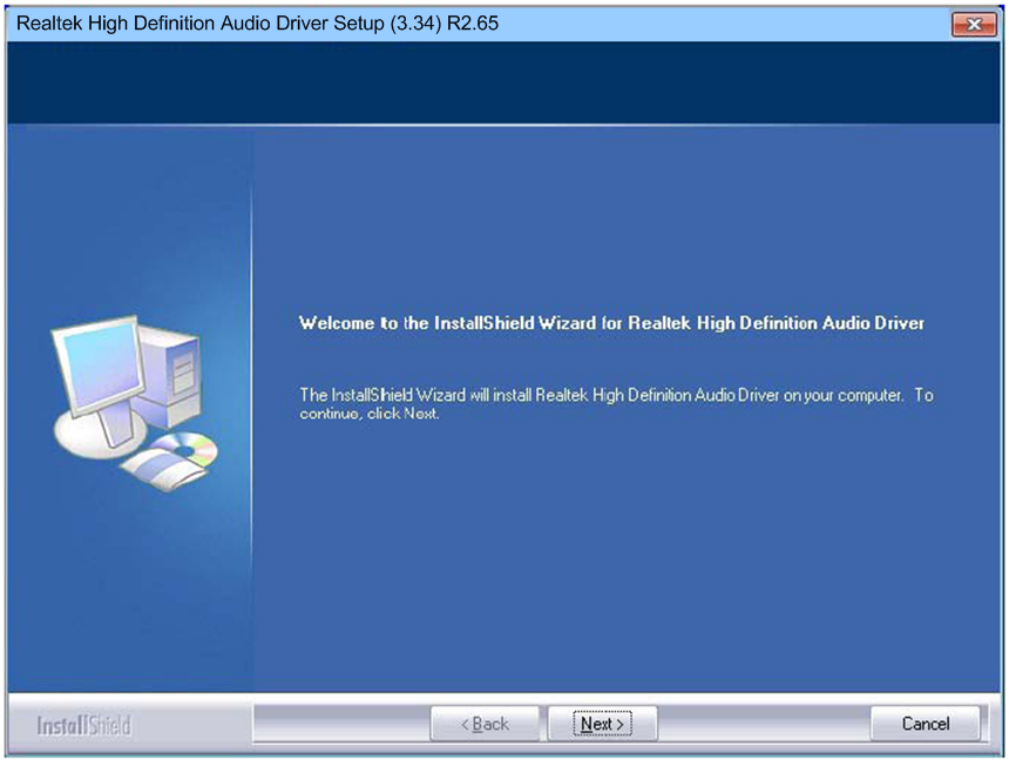


3. Click “Finish” to complete the installation.

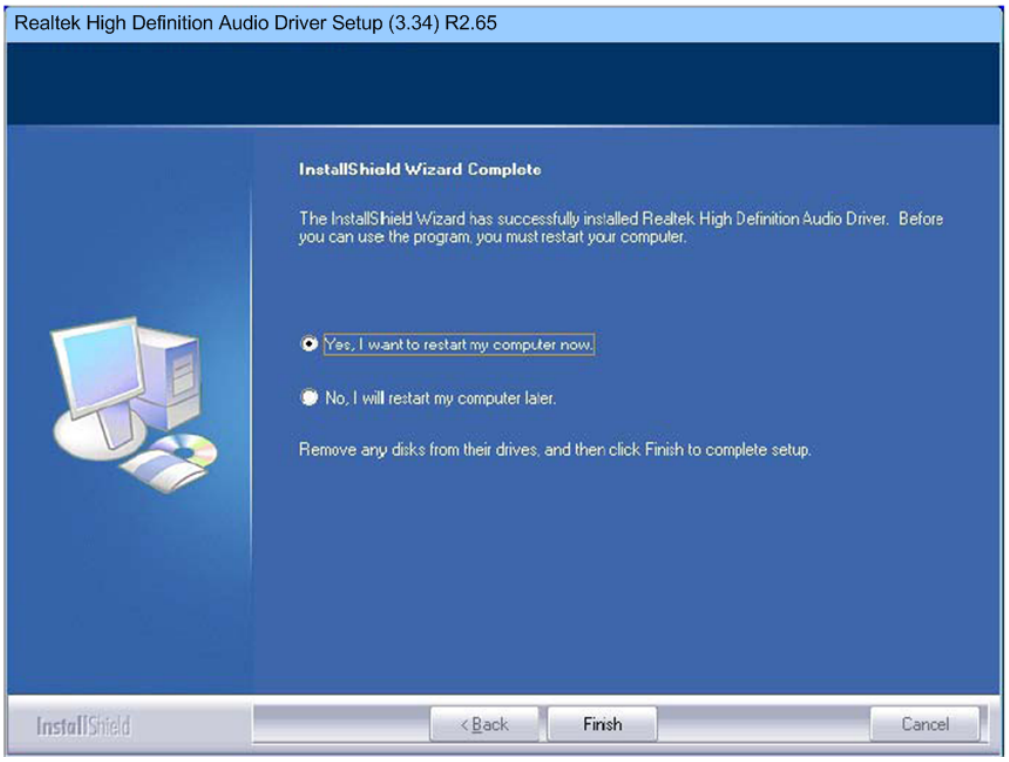


6.4 Installing Audio Driver

1. Run the setup.exe for audio from the driver directory in product information CD. Click "Next" to continue.


Realtek High Definition Audio Driver Setup (3.34) R2.65
Welcome to the InstallShield Wizard for Realtek High Definition Audio Driver
The InstallShield Wizard will install Realtek High Definition Audio Driver on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

2. You are suggested to select “Yes, I want to restart my computer now”. Click “Finish” to complete the setup process and reboot.


Realtek High Definition Audio Driver Setup (3.34) R2.65
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Realtek High Definition Audio Driver. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

6.5 Installing AHCI Driver

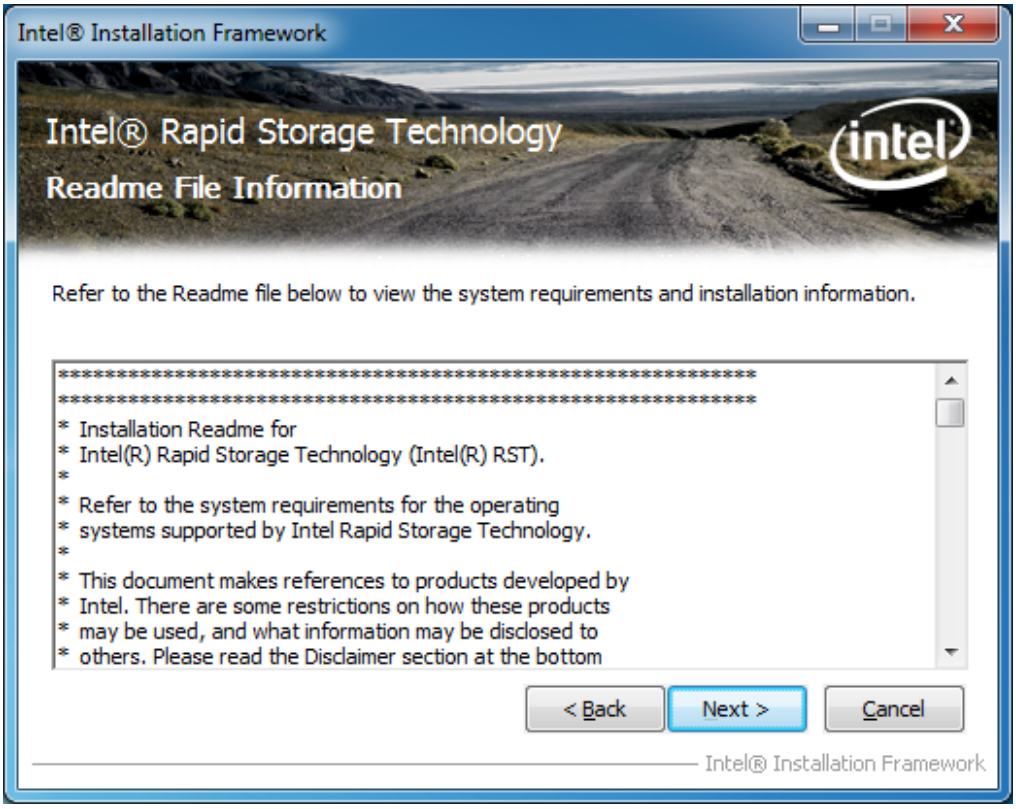
1. Run the iata_enu_10.8.0.1003.exe for AHCI from the driver directory in product information CD. Click “Next” to continue.

Intel® Installation Framework
Intel® Rapid Storage Technology
Welcome to the Setup Program
intel
This setup program will install Intel® Rapid Storage Technology onto this computer.
It is strongly recommended that you exit all programs before continuing. Click Next to continue.
Install Intel® Control Center
Intel® Control Center provides a centralized starting point for Intel applications making it easier to find the programs that you need.
< Back
Next >
Cancel
Intel® Installation Framework

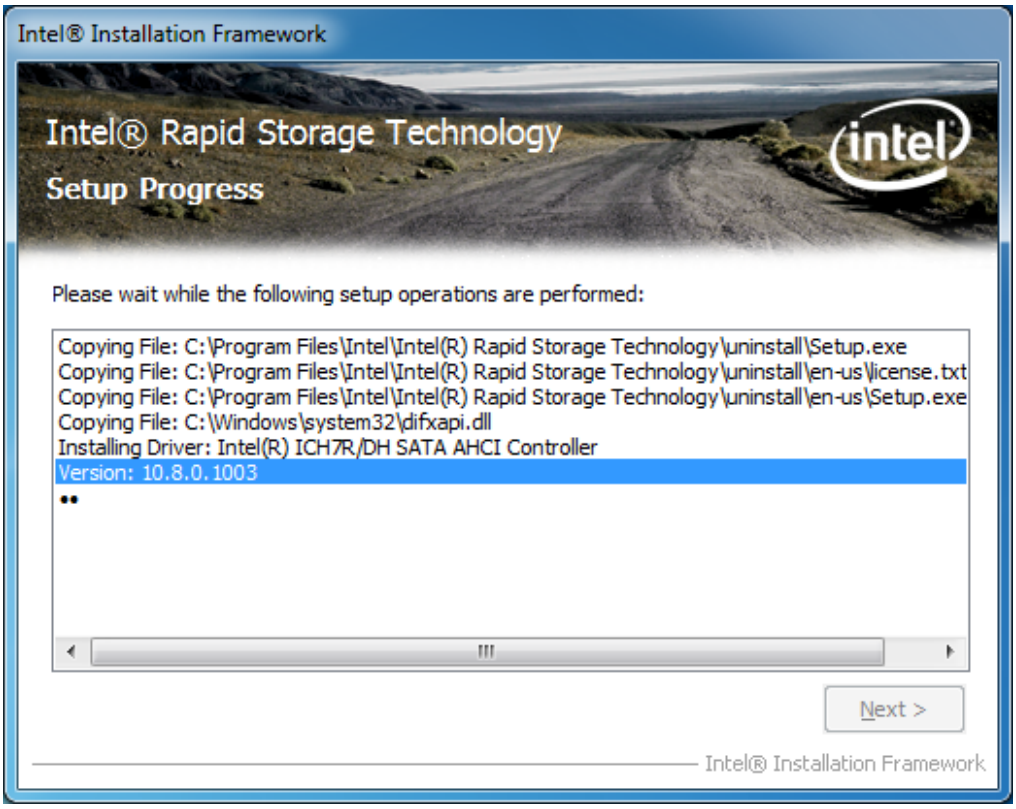
2. When Intel® License Agreement screen appears, please click “Yes” to next step.

Intel® Installation Framework
Intel® Rapid Storage Technology
License Agreement
intel
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
* If you are an End-User, then only Exhibit A, the INTEL SOFTWARE LICENSE AGREEMENT,
< Back
Yes
No
Intel® Installation Framework

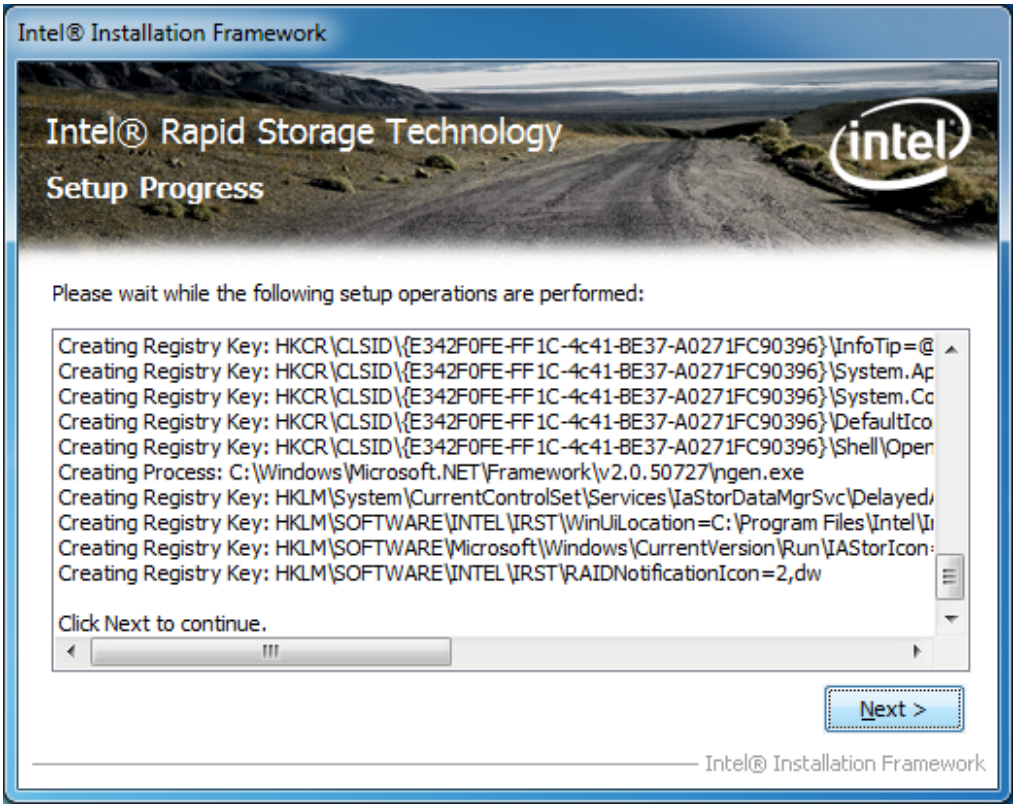
3. A Readme File Information screen appears to show you the system requirements and installation information. Click “Next” to continue.


Intel® Installation Framework
Intel® Rapid Storage Technology
Readme File Information
intel
Refer to the Readme file below to view the system requirements and installation information.
****
****
* Installation Readme for
* Intel(R) Rapid Storage Technology (Intel(R) RST).
*
* Refer to the system requirements for the operating
* systems supported by Intel Rapid Storage Technology.
*
* This document makes references to products developed by
* Intel. There are some restrictions on how these products
* may be used, and what information may be disclosed to
* others. Please read the Disclaimer section at the bottom
< Back
Next >
Cancel
Intel® Installation Framework

4. Please wait while setup processes the following operations.


Intel® Installation Framework
Intel® Rapid Storage Technology
Setup Progress
Please wait while the following setup operations are performed:
Copying File: C:\Program Files\Intel\Intel(R) Rapid Storage Technology\uninstall\Setup.exe
Copying File: C:\Program Files\Intel\Intel(R) Rapid Storage Technology\uninstall\en-us\license.txt
Copying File: C:\Program Files\Intel\Intel(R) Rapid Storage Technology\uninstall\en-us\Setup.exe
Copying File: C:\Windows\system32\difxapi.dll
Installing Driver: Intel(R) ICH7R/DH SATA AHCI Controller
Version: 10.8.0.1003
Next >
Intel® Installation Framework

5. When the following screen appears, please click “Next”.



6. You are suggested to select “Yes, I want to restart this computer now”. Click “Finish” to complete the setup process and reboot.

Intel® Installation Framework
Intel® Rapid Storage Technology
Setup Is Complete
intel
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart this computer now.
No, I will restart this computer later.
Click Finish, then remove any installation media from the drives.
Finish
Intel® Installation Framework

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Appendix A
Watchdog Timer

About Watchdog Timer

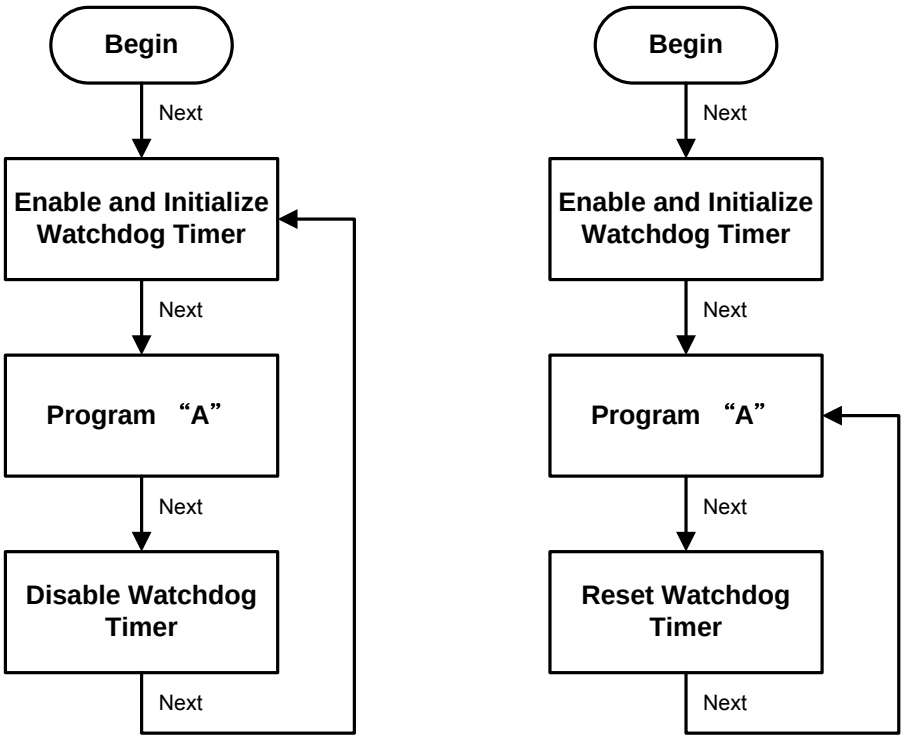
Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

How to Use Watchdog Timer

The I/O port base addresses of watchdog timer are 2E (hex) and 2F (hex). The 2E (hex) and 2F (hex) are address and data port respectively.

Assume that program A is put in a loop that must execute at least once every 10ms. Initialize watchdog timer with a value bigger than 10ms. If the software has no problems; watchdog timer will never expire because software will always restart the counter before it reaches zero.



Sample Program

Assembly sample code :

```
;Enable WDT:
mov     dx,2Eh
mov     al,87            ;Un-lock super I/O
out     dx,al
out     dx,al

;Select Logic device:
mov     dx,2Eh
mov     al,07h
out     dx,al
mov     dx,2Fh
mov     al,08h
out     dx,al

;Activate WDT:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,01h
out     dx,al

;Set Second or Minute :
mov     dx,2Eh
mov     al,0F5h
out     dx,al
mov     dx,2Fh
mov     al,Nh           ;N=00h or 08h(see below Note)
out     dx,al

;Set base timer :
mov     dx,2Eh
mov     al,0F6h
out     dx,al
mov     dx,2Fh
mov     al,Mh           ;M=00h,01h,...FFh (hex),Value=0 to 255
out     dx,al           ;(see below Note)

;Disable WDT:
mov     dx,2Eh
mov     al,30h
out     dx,al
mov     dx,2Fh
mov     al,00h          ;Can be disabled at any time
out     dx,al
```

***Note**:*
*If **N**=00h, the time base is set to second.*
***M** = time value*
00: Time-out Disable
01: Time-out occurs after 1 second
02: Time-out occurs after 2 seconds
03: Time-out occurs after 3 seconds
.
.
FFh: Time-out occurs after 255 seconds

*If **N**=08h, the time base is set to minute.*
***M** = time value*
00: Time-out Disable
01: Time-out occurs after 1 minute
02: Time-out occurs after 2 minutes
03: Time-out occurs after 3 minutes
.
.
FFh: Time-out occurs after 255 minutes